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THE
DENTAL COSMOS:

A
MONTHLY RECORD OF DENTAL SCIENCE.

Devoted to the Interests of the Profession.

EDITED BY
EDWARD C. KIRK, D.D.S.

Observe, Compare, Reflect, Record.

VOL. XLIII.

PHILADELPHIA:
THE S. S. WHITE DENTAL MANUFACTURING CO.,
CHESTNUT STREET, CORNER OF TWELFTH.

1901.

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THE
DENTAL COSMOS.

VOL. XLIII.

PHILADELPHIA, JANUARY, 1901.

No. 1.

ORIGINAL COMMUNICATIONS.

THE HISTORICAL DEVELOPMENT OF DENTAL ART.

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(Read before the International Dental Congress at Paris, August 8, 1900.)

It is generally thought—not only by those who do not belong to the dental profession, but by dental practitioners and by physicians as well—that dental diseases were very rare, if not entirely unknown, in ancient times, and that their frequency in modern times depends on our too refined and delicate food and on the general weakness of our organism produced by a condition of living that is too far removed from that prescribed by nature.

Although it is not possible to deny that there is some truth in this assertion, the history of dental art demonstrates clearly that the above opinion is in the main false, for at most remote epochs dental diseases were neither unknown nor rare.

The papyrus of Ebers, the oldest medical manuscript known, treats of the diseases of the teeth and gums. In this very interesting book of ancient Egypt (its origin, according to the researches of Egyptologists, dating as far back as 3700 B. C.) not less than fourteen prescriptions for the treatment of several dental diseases are found. Hence it is evident that the men who lived fifty-six centuries ago also suffered from diseases of the teeth.

At that very remote epoch dental medicine was a part of general medicine. I say dental medicine because the papyrus of Ebers does not mention dental surgery. It seems that the initiator of this last science was Esculapius, who flourished thirteen centuries B. C., and who on account of his healing abilities was regarded as a god, because at that primitive epoch nothing seemed so magnificent and so surprising as the power of arresting pain and of restoring health

or life to sick or dying individuals, and sometimes even to dead ones. According to tradition, Esculapius invented several important curative methods, among them the extraction of teeth. It may be that Esculapius was the inventor of the odontagogen (instrument for the extraction of teeth) which was preserved in the temple of Apollo at Delphi.

The celebrated historian Herodotus of Halicarnassus, writing at about the year 450 B. C., states that in his time Egypt had a considerable number of physicians who, instead of treating indifferently all diseases, had devoted themselves to specialties. Some took up diseases of the eyes, others diseases of the *teeth*, others diseases of the head, abdomen, or genital organs. Hence it is not doubtful that in the fifth century before Christ dental art was cultivated in Egypt as a true specialty.

What degree of development had dental art reached in Egypt? Unfortunately, we do not know. All the assertions regarding artificial teeth, pivot teeth, and teeth with gold fillings that are said to have been found in Egyptian mummies are entirely devoid of foundation. In spite of the scrupulous and conscientious researches of Ebers, the illustrious professor; of Emile Smith, the craniologist; of the learned Virchow, of the dentist Mummery, and of others, nothing has been found in the hundreds and hundreds of Egyptian skulls (not even in those belonging to the mummies of kings) that could be connected with the dentist's work. Nothing in this connection was found by Mr. Daressy, the conservator of the museum of Gizeh, where all the archeological wealth of Egypt is concentrated.

Dr. Fouquet (a resident of Cairo) did not find anything during his long anthropological studies on Egyptian mummies. Nevertheless, this same Dr. Fouquet affirms that it is impossible that dental prosthesis should have been unknown to the Egyptians. It may be, he says, that their religious laws prohibited them from having recourse to it. It may have been that the embalmers removed systematically all prosthetic pieces. It is not admissible that the Egyptians should not have known prosthetic dentistry when their neighbors, the people of Phœnicia, a country with which they had very intimate commercial relations and over which Egypt extended its sovereignty (about the sixth century before Christ), practiced it. Besides, Phœnician and Egyptian civilization exercised a profound influence over each other, and at last were converted into one.

We have said that the Phœnicians practiced dental prosthesis. Now, what gives us the right to make such an affirmation? We get it in the most luminous and convincing way by the prosthetic piece found in 1862 by Dr. Gaillard in one of the most ancient tombs of the necropolis of Sidon. This piece, made with two human teeth united to the neighboring ones by means of gold wire, dates as far back as four hundred years before Christ.

Some of the prosthetic pieces found in the Etruscan necropolis are probably more ancient than that ancient Phœnician dental fixture. Five of these pieces were described and reproduced by me in 1894, at the Eleventh International Congress of Medicine

and Hygiene. It is for this reason that I will not refer to them again. I will only recall that the examination of these pieces demonstrates clearly that the Etruscan dentists knew how to make a variety of bridge-work.

Two of these pieces are found in the civic museum of Corneto, two in the museum of Count Bruschi, also in Corneto, and another in the museum of Pope Julius in Rome.

Another dental appliance discovered in an Etruscan necropolis near Orvieto belongs to the University of Ghent, to which it was sold. It is attached to a fragment of a superior maxilla where six molars and two canines are seen, while the four incisors are absent. The alveoli of the missing teeth have the normal width and depth, things which prove that the teeth had been fixed to the alveoli and remained there until the end of life. To the right canine is attached an appliance made of pure gold composed of a small plate folded and soldered, which, with the aid of two small bars of the same metal, divides the plate into three compartments; the lateral ones small, and the middle one twice as large. The lateral compartment of the right side contains the canine tooth of the same side; the lateral compartment of the left side must have contained the left central incisor, which has now disappeared, while the central compartment must have contained the two incisors of the right side.

As no pivots were found, and as the alveoli were not obliterated, it is not doubtful that the appliance was for the purpose of preventing the loss of the right central and lateral incisors by keeping them in an immovable position.

Dental art began to be practiced among the Romans in the most remote epochs. It is supposed that it was imported by the Etruscans. It is very well known that in the law of the Twelve Tables, promulgated 450 B. C., mention is made of teeth united by means of gold. The text does not say if this observation refers to artificial teeth or simply to loose teeth kept immovable by means of gold wires or bars. Whatever it means, it is not doubtful that four centuries and a half before Christ dental appliances of this kind were made in Rome.

A little later, about four hundred years before the Christian era, history records the appearance of the works of the celebrated Hippocrates. This great man registers in his books many observations relating to diseases of the gums and their treatment. The principal dental operations to which Hippocrates refers are extraction and cauterization. He also speaks about ligating teeth with gold wire or linen thread in cases of fractures of the lower jaw.

Against the fetor of breath, due to a morbid condition of the gums, Hippocrates advises the use of a dentifrice composed of marble dust and of the cinders resulting from the combustion of the heads of one hare and three mice. This is a strange dentifrice, which would disgust the dames of modern times, but which was at that time specially prescribed to women. The works of Hippocrates do not treat of prosthetics, but this does not prove that the Greeks ignored it. Numerous and learned authors of medical works have been entirely mute regarding dental prosthesis, even in

times when it became generalized. This must be attributed simply to the fact that dental prosthesis was never practiced by physicians, but by specialists; and although Hippocrates does not mention it in his works, it is nevertheless possible that it was practiced by the Greeks.

In a tomb of ancient Tanagra, a Greek village situated near Thebes, a dental appliance was found. This is now in the possession of Dr. Lambros, of Athens. This appliance dates from three hundred to four hundred years before Christ. It is very simple, for no clasps or pivots are seen. Just as in the case of the Etruscan appliances, it is composed of a small bar of very pure gold, of about half a centimeter in length, folded in such a way as to form an elliptical ring, which when applied around the four incisors kept them in a fixed position, acting like a splint. In spite of the simplicity of this appliance when compared with the Etruscan ones, it serves to demonstrate that at the epoch of Hippocrates or a little later on dental appliances were made in Greece.

The same Dr. Lambros assures us that teeth having gold fillings or other obturations have been found on several occasions in ancient tombs. It is permissible to have a relative doubt of this assertion, inasmuch as Dr. Lambros does not speak from his own personal observations, but seems to quote those of others. Nevertheless, a fact told by the celebrated archeologist Eugène Toulouze tends to demonstrate that the filling of decayed teeth was practiced by the ancients, although it is impossible to say when and where this operation began to be practiced. While studying a Gallo-Romanic tomb Dr. Toulouze found between two molars something resembling a yellowish crust. He thought at first that it was tartar, but after removing with a knife a few scales from the surface he found that it was not a substance that had been placed between the teeth, but a filling in a cavity in one of those teeth. In fact, it was a filling that had been made of a paste, and, as the excess had not been removed, it hardened between the teeth. The hardness of this substance is considerable; so much so that the blade of the knife became blunted.

Now, if the practice of filling teeth was known in Gaul, with greater reason it must be admitted that it was known to the Romans, the conquerors and civilizers of the Gaul; and also to the Greeks, a people more civilized than the Romans and by whom the latter were taught the sciences and arts.

At the time of Aristotle, the great Greek philosopher, four hundred years before Christ, the extraction of teeth must have been a common operation. Aristotle speaks of it in his book on mechanics. He examined the mechanism of the dental forceps, and says that this instrument consists of two levers acting in opposite directions and having a single fulcrum.

At the beginning of the present era Cornelius Celsus, whose treatise on medicine is of great importance, in his history of odontology reviews not only a great number of anti-odontalgic remedies, or so supposed to be, but also speaks of the different surgico-dental operations. He advises not to be in a hurry to

extract carious teeth, and to proceed to this operation only in cases in which all the remedies used have had no satisfactory result. Celsus also mentions the different methods of producing the exfoliation of teeth without recurring to extraction. He gave as an example the exfoliation of a tooth produced by introducing in the carious portion of the tooth a grain of pepper devoid of its husk, or by applying around the tooth a plaster whose composition would include the burned and powdered scales of the trygon's tail. It should be observed that in the centuries after Celsus the remedies supposed to be capable of causing the exfoliation of the teeth to which they were applied became gradually very numerous. They were very popular in the middle ages, and were used until a few centuries ago.

While Hippocrates considered the extraction of teeth as a very easy operation, one without any importance (probably because at that time only loose teeth were extracted), Celsus, on the contrary, speaks of the serious dangers surrounding this operation. He wants it to be practiced with great precaution, and says that the gum should be dissected away, the tooth luxated, and then extracted if possible with the fingers, if not with the forceps, taking care to use them in a straight direction, in order to avoid fracture of the bone. When the tooth has a large cavity Celsus recommends to fill it with gauze or with lead, in order to prevent the tooth from breaking under the pressure of the instrument.

The hemorrhage following the extraction of teeth was believed by Celsus to be due to fracture of the bone. In such cases he recommended to search for the portion of the bone with a stiletto, and to remove it with a pair of pliers. For the extraction of roots they used a special forceps called in Greek *rhizagra*.

The other operations that Celsus refers to are the lancing of abscesses of the gums, the treatment of fistulæ of the gums by means of the extraction of decayed teeth, or through the removal of necrosed fragments of bone, and by scraping the bone; slight cauterizations of the gums in cases of loosened teeth; ligating loose teeth to the neighboring healthy ones by means of gold wire; scraping of uneven and stained teeth, and the correction of a dental deformity which takes place when the permanent tooth erupts before the deciduous one has been lost. Celsus advises that in such cases the gum over the deciduous tooth shall be dissected and the tooth extracted, and to exert pressure upon the irregular tooth every day with the fingers until the normal position has been reached.

Notwithstanding the complete silence of Cornelius Celsus in regard to dental prosthesis, it is probable that it was practiced in his time, for Horace in his satires and Martial in several of his epigrams speak very clearly of artificial teeth. Those teeth were made of bone or ivory, and the prosthetic method reached a remarkable degree of perfection, for even removable appliances were made. These were removed before retiring, and were replaced in the morning.

At that time dentifrices and tooth-picks were largely used. The

tooth-picks were made of lentisk wood or of quill, but metallic ones were also used, specially those made of silver.

At about the beginning of the second century after Christ the illustrious Archigenus invented the trepanation of teeth; an operation that he performed when a tooth that had changed its color, in spite of the absence of caries, was the seat of violent pains and was refractive to all kinds of remedies.

During the thousand years that elapsed between the downfall of Roman civilization (fifth century) and the renaissance of modern civilization at the close of the middle ages, we find dentistry, like the sciences and arts, in a condition of marked decline. The little that was achieved in the domain of dentistry during that very long period must be attributed to the work of the Arabs. Rhazes was the initiator of the operation of filling teeth, using for this purpose a mixture of mastic and alum. At the eleventh century Abulcasis, in his celebrated book on surgery, gave illustrations of a great number of dental instruments. Among them were fourteen scrapers for the removal of tartar; forceps and elevators of different types for the extraction of teeth and roots; files and saws to shorten the teeth projecting beyond the level of the other teeth and to polish the points of broken teeth tending to injure the tongue.

This author treats of the use of gold and silver wires for the retention of loose teeth, or for the placing of artificial ones made of ox-bone. But the most important thing about Abulcasis is that he was the first to mention replantation, advising this operation whenever one or two teeth should fall out by reason of a traumatic injury.

Jean Arculanus, professor in Bologna in the fifteenth century, was the first to mention the filling of teeth by means of sheets of gold. His allusions lead us to believe that this practice was in use before his time.

The celebrated Ambroise Paré, who first was a barber and who later became the greatest surgeon of the sixteenth century, advises replantation not only in cases of loss of teeth through traumatism, but also in cases where healthy teeth are erroneously extracted for diseased ones. This author is the first to record a case of transplantation,—one described to him by a truthful person and that he accepts as a sincere narration notwithstanding the extraordinary appearance of the case. The greatest achievement of Ambroise Paré was to discover the method of treating palatal perforations by means of obturators.

In 1593 rumors of a miraculous case became general in Silesia. It was said that a golden tooth had erupted in the mouth of a seven-year-old child. This fact was the cause of long and severe polemics among the learned men of that epoch. Afterward it was discovered that it was only a natural tooth that had been skillfully surrounded by a little gold band. In consequence we can affirm that the first gold crown was made in 1593; not with a therapeutic end, but with the purpose of defrauding the people, for the child's father demanded a contribution from every person who desired to see the child.

Numerous authors of the seventeenth century contributed in important proportions toward the development of dentistry. The Frenchman Dupont made of replantation a special curative method, advising that in cases of severe odontalgia the tooth should be extracted and replanted immediately after. This is an operation that had not been performed before. Lazare Rivière and Nicolas Tulp practiced with great success packing (*tamponnement*) as a curative method of hemorrhages brought about through extraction of teeth.

Higmore, in 1651, gave an exact description of the maxillary sinus, and later on Meibom, Cowper, and Drake began the rational treatment of the diseases of this cavity that nearly always originate in some dental disturbance. Geoffroy Purmann was the first to use plaster impressions in order to make prosthetic pieces more accurate. The Hollander Antoine Nuch recommended the use of hippopotamus teeth for the construction of plates, claiming that this substance preserves for a long time its whiteness, a condition that does not obtain in ivory. Cristophe Schelhammer (who considered the filling of decayed teeth as the best means of preventing pain) filled the tooth after extracting it and then proceeded to replant it, combining for the first time the two operations of filling and replantation.

We owe a special mention to the French surgeon Pierre Dionis for recording the fact that a man named Guilleméau made artificial teeth with a paste whose composition contained, among other things, powdered white coral. This can be considered as the first step toward the use of mineral teeth.

Dentistry, practiced during many centuries nearly exclusively by ignorant barbers and "tooth-pullers," became a high and deserving profession in the first portion of the eighteenth century through the work of Pierre Fauchard. He collected in a masterly work, instructive and interesting to read even to-day, everything that had been done in the domain of dentistry before him, everything that his long experience taught him, and all the improvements that his inventive genius enabled him to introduce into the practice of his specialty in prosthesis. Thanks to Fauchard's work, the existence, independence, dignity, and rights of dentistry became affirmed, and it is only just that he should be considered the founder of modern dentistry.

In 1746 Mouton published a monograph where, for the first time, mention is made of gold crowns (*calottes d'or*) for the arrest of the ultimate destruction of teeth already very much disorganized. When the teeth to be crowned were the front ones Mouton had the crowns enameled, in order to give them the color of natural teeth. Mouton was the first to introduce the use of artificial teeth retained by means of clasps, and in consequence movable. This represented a perceptible progress in comparison with the system used until that time, and consisting in ligating the artificial teeth to the neighboring healthy ones by means of wire made of gold or of some other material.

Another French dentist, Lecluse, invented and improved dif-

ferent dental instruments; among them the elevator which bears his name.

Philip Pfaff, dentist to the king of Prussia, published in 1756 a remarkable treatise on odontology, where for the first time reference is made to wax impressions and plaster models, while Geoffroy Purmann, already quoted, only referred to wax models, without indicating the manner of obtaining them and without speaking of the impressions. This author was the first one who practiced the operation of capping exposed pulps. It must also be noticed that he mentions the use of artificial teeth made of mother-of-pearl.

In the eighteenth century replantation and transplantation were usual operations. A book of the celebrated dentist Bourdet says that "a charlatan of this epoch dared to implant teeth in holes made for this purpose in the jaws." But the contempt and indignation with which Bourdet talks of this dentist and of his work were very unjust, because, after all, this skillful operator had imagined and executed a new and very important operation. The implantation of teeth in artificial alveoli gave a great reputation to Younger, the American dentist, to whom is generally given the credit of the discovery.

In 1788 the dentist Dubois de Chemant invented mineral teeth. These teeth were successively improved by Dubois-Foucou, by Fonzi in 1808, and by the Americans,—Stockton in 1825, Wildman in 1837, and lastly by the celebrated Samuel S. White.

In the United States one of the first and most illustrious representatives of dentistry was James Gardette. Born and raised in France, he was at first surgeon in the French navy; then, after numerous adventures, he began the practice of dentistry in Philadelphia in 1784; and a little time after that he acquired a great celebrity. Gardette was the first to use metallic plates as a base for prosthetic pieces, while before him the bases were made of ivory, of hippopotamus teeth, or of similar materials. He was also the first to use atmospheric pressure as a means of retaining upper plates. Besides this, he introduced important improvements in the use of models, and his inventions effected a marked change in prosthesis and in dental technique.

An eminent French dentist, contemporary of Gardette, Jean Baptiste Gariot, invented the articulator about 1805. He also invented and described for the first time dental bridges, greatly improved later on by American dentists.

Regnart, another French dentist, in a pamphlet published in 1818, described an amalgam of his invention, also the manner of using it either for fillings, for setting pivot teeth, or for the making of models.

In 1835 Spooner, an American dentist, used for the first time arsenous acid for the devitalization of the dental pulp.

Between this date and 1840 three events of considerable importance took place: The foundation of the first odontological society, of the first dental school, and of the first dental journal. In 1837 the Society of Dental Surgeons of New York was organized. Its existence was only ephemeral, but three years after the American

Society of Surgeon Dentists was organized, and it soon became flourishing. In 1839 the first dental school in the world (Baltimore College of Dental Surgery), and the year after the first dental journal, *The American Journal of Dental Science*, were founded.

The wonderful progress made by dentistry in our century began with the establishment of schools, journals, and dental societies,—the best means for the propagation of professional culture.

It would require a great deal more time than I have at my disposal if I should mention even rapidly all the inventions, all the discoveries, all the progress achieved in dental surgery in the last sixty years. I have to limit myself to the most important facts.

In 1840 the celebrated Tomes introduced radical changes in the form of extracting instruments, making it possible to extract any tooth with a perfectly adapted forceps without the inconveniences and dangers surrounding the use of the key and of other similar instruments that are now displayed in the museums.

In 1844 Horace Wells, the American dentist, discovered surgical anesthesia, by which he became one of the greatest benefactors of suffering humanity.

The first filling with spongy gold was made in Boston, in 1846, and nine years later the dentist Robert Arthur, of Baltimore, communicated to the dental profession his important discovery of cohesive gold, rendered so by heating.

At about the end of 1847 gutta-percha began to be used for temporary fillings.

In 1855 Charles Goodyear introduced the use of vulcanizable rubber.

In 1856 oxychlorid of zinc began to be used. This was the beginning of the introduction of a series of cements.

Barnum in 1864 devised the rubber dam. Dean in 1866 invented the automatic mallet, and Morrison in 1870 the dental engine that has been of such great help to the dentist, especially before the introduction of electric motors.

We will end this *résumé* of the historical development of dentistry by recalling the great advantages that dentistry, in common with general surgery, has derived from the antiseptic method, and also the not less important advantages that dentistry has derived and will derive in the future from the varied applications of electricity.

CONCLUSIONS.

Contrary to an idea extensively prevalent, the diseases of the dental system were not rare even in the most remote epochs.

The origin of dental art goes as far back as 3000 B. C. The ancient Egyptians, Phœnicians, Greeks, Etruscans, and Romans practiced dental prosthesis, the Etruscans manufacturing relatively good pieces of bridge-work. The Romans executed not only fixed prosthetic pieces, but also removable ones.

The middle ages were for dental art, as well as for sciences and arts, a period of marked decline.

Dentistry progressed slowly in the modern age until the creation of the dental schools. From that time its progress became very rapid.

As the progress of dental art and of dental culture are intimately related to a good professional training, it is to be regretted that in some civilized countries the foundation of special schools for the teaching of dental art has been neglected.

MODERN IDEAL CROWN-WORK.

BY HART J. GOSLEE, D.D.S., CHICAGO, ILL.

(Read before the Northeastern Dental Association, Providence, R. I., October 19, 1900, and the union meeting of the Seventh and Eighth District Dental Societies of the State of New York, October 30, 1900.)

For the past half-century there has been a gradually increasing appreciation of the requirements in the construction of artificial substitutes for lost natural crowns of teeth, with a tendency toward obtaining the very highest degree of artistic perfection,—work which, while restoring former functional usefulness, may at the same time reproduce, or even improve upon, nature; together with the prerequisites of stability and protection to the root, which would insure permanence in the operation.

The evolution of methods of construction and application of artificial crowns has from the very first conception shown marked improvement and development, until now it is within the province of the modern progressive operator to produce and obtain results which, if perfection is possible, mark the advent of such an era in this line of work.

With the development of the field of possibilities in any line of art, so also increase the requirements. Within the memory of many to-day the Foster, Gates, and Bonwill crowns were a revelation, for they filled a long-felt want and as nearly as possible met the requirements of the times. Then the Webb, Logan, Brown, and Richmond designs, as well as many other similar ideas and methods, were given us; each at the time seeming to serve a particular sphere of usefulness, and to possess advantages and improvements over each other. To our experience with all of these various styles, their advantages and disadvantages, do we owe this knowledge of the requirements and this appreciation of the fundamental principles upon which success and permanence are dependent.

Since the application of the ceramic art in dentistry, however, and the ever-increasing facilities for its use, we are now able to see our efforts more nearly approach the ideal than ever before. That this class of work is a success no one can doubt, and those who have become discouraged through failure owe it to themselves to ascertain the cause and endeavor to overcome it because of the great scope of possibilities in the field of esthetic dental art, to obtain which means only judicious application and careful manipulation.

Conceding these advantages and possibilities, and the satisfaction to be derived from them, success, however, depends largely upon the application and construction of the work, for we are

governed to a great extent in the former by conditions of absorption and occlusion, and in the latter by judgment, skill, and experience; as it must always be remembered that porcelain is mineral and friable in nature, and that *the strength is increased in proportion to the bulk*. Hence its use and application has its limitations; and while not always universal, is far more so for individual crowns than any other, which may be observed by a brief consideration of the requirements.

CROWN REQUIREMENTS.

1. *Fit*.—As the result of experience a great majority of the profession now agree that a crown with a band encompassing the end of the root is essential to permanence, because of the immunity from the penetration of secretions into the joint, the protection of the root from subsequent decay or fracture thus afforded, and the increased stability. Hence it seems needless to more than mention with emphasis that a perfect-fitting band is the first essential.

2. *Occlusion*.—The next requirement in relative importance is occlusion, because, if that is not secured and does not obtain, the function and usefulness is impaired, and the liability for breakage, if any porcelain be used, is increased.

3. *Strength*.—Next in importance is strength, which of course any kind of crown must possess in order that it may successfully and permanently withstand the stress and influence of mastication.

4. *Approximal Contact*.—The importance of this feature is at once obvious, because of the necessity for the protection and preservation of the tissue in the interproximal space.

5. *Esthetic Appearance*.—This requirement, while placed last, is by no means least in importance, because to it belongs the *art* which gives scope to the individuality of the operator, and separates the mechanic and artisan from the artist.

After thus briefly observing the requirements, let us pass to a consideration of the indications and contra-indications for the use of this work.

CONTRA-INDICATIONS.

The application of porcelain crowns would be contra-indicated in those cases where the "bite" is so close that it would be found impossible to use enough of it in bulk to possess strength, and where no breakable material or anything but metal could be depended upon to withstand the force of mastication.

INDICATIONS.

The special indications for the use of porcelain are particularly in the ten anterior teeth, frequently in the molars, and in those cases where gum reproduction may be necessary and desirable in all presentations of average favorable occlusion.

Anterior Teeth.—In crowning the six anterior teeth the very objectionable feature of a metal backing extending to the incisal edge, which completely deprives the facing of its translucency, is overcome; as is also the occurrence of those dark blue lines along the joints between facing and backing due to the penetration of secretions, which objectionable and unhygienic condition is so often

noticeable. Together with these advantages do we also reduce to a minimum the possibility of the facing becoming fractured in the mouth, because where the facing and backing are used the porcelain is retained to its backing simply by means of the attachment pins, while in the porcelain baked crown the facing is retained not only by the pins, but also by the etching or fusing of the "body" over the entire surface. This combined attachment makes it practically impossible to have the facing break away without all of the porcelain coming with it, which seldom occurs. Hence in point of relative strength there is no comparison, aside also from avoiding the display of any metal.

Bicuspid.—The bicuspid is particularly *ideal* indications for the porcelain crown, because of the simplicity in their construction and the difficulty of making any other style that would not entail much more effort and show more or less gold, and because of the frequency with which we here see the unsightly gold crown, which practice in the face of our present opportunities for concealing the artificial I now regard as almost criminal.

Molars.—While it is true that in many instances nothing will ever take the place of the gold telescope crown for molars, serve the purpose so well, and be so absolutely indestructible, yet there are many indications for the use of porcelain, especially on first molars. And there is frequently an advantage in their application even over the gold crown, because of the fact that where the root is cut down short a more perfectly fitting and better adapted band is not only made possible, but is invariably the result; thus adding much to the longevity of the root by overcoming the tendency to subsequent recession of the surrounding tissues due to the irritating influences of an imperfectly adapted band, such as is so often found where the remaining natural crown is left long and telescoped.

PRACTICAL APPLICATION.

To a very appreciable extent much of the success of this work depends upon proper root-preparation; and the converse of the proposition is also true, as many of the failures resulting accrue from a neglect of the importance of this step.

Root-preparation.—The requirements here are similar to those for any style of dowel crown with a band, excepting that all roots *must be cut shorter* because of the necessity for making as much space as possible for the porcelain, thus attaining the greatest degree of strength in the finished crown.

In sacrificing the remaining portions of the natural crown, however, they should first only be cut down to within about one-sixteenth of an inch of the cervix or gingivæ until the remaining ledge of enamel has been removed, the measurement taken, and *the band fitted*; each of these steps then being greatly facilitated by having this surplus or projecting end of the root to work upon, after which it may be cut down on a line with the gingivæ.

In dismissing the patient, however, after finishing this portion of the operation, the precaution should always be observed of packing temporary stopping into the canal and allowing it to cover the end

of the root, so as to prevent the tissue from crawling over the exposed edge during the interim, as this often interferes with the permanent setting of the crown when completed. Where the crown is for an anterior tooth it is a good and most satisfactory practice to make a temporary one to be worn while the permanent one is being finished. This consumes but a few moments' time, or only long enough to select a facing, grind it to fit approximately, fit a German-silver post to the canal, and soft solder it to the facing; then mount with temporary stopping. The gum is kept back nicely, and the patient is not subjected to the usual temporary disfigurement.

Bands.—The fitting of the band is of course very important, but is rendered more or less easy by leaving the root as described until this step has been accomplished, as it serves to conform it to the proper shape and guides it into place. In pressing it into position it should be so trimmed as to meet the gum line evenly at all sides before passing under it, and should be as narrow as possible to meet the requirements; but, being narrow and in order that it may possess strength, no thinner than twenty-eight gauge pure platinum should be used.

If pure gold be used for solder a lapped joint should always be made, which precludes the possibility of its opening under the influence of the expansion, which precedes the shrinkage, in the subsequent baking. Where platinum solder is used the joints may be *butted*.

Cap.—The metal used for the floor to the band which forms the cap should be preferably of thirty-two gauge platino-iridium, in order that the cap may possess every available strength sufficient to permanently retain its shape.

Posts.—In the preparation of canals for the reception of posts care should be exercised to avoid enlarging them any more than is absolutely necessary. The post should be proportionate in size with the root,—sixteen gauge (B. & S.) for centrals, cuspids, and molars, and eighteen gauge for laterals, bicuspid, and all of the lower anterior; and should be of platino-iridium, in order to be stiff, rigid, and unyielding. They should extend into the canal a distance nearly equal to the length of the crown, in order to overcome the force of leverage. Should fit at least two walls closely, and in passing through the floor of the cap should be placed far enough to the lingual so that the surplus end may not interfere with the facing in its adjustment to proper relation with the cap. A square or triangular post is preferable, because of overcoming the tendency to rotate on conical roots, and for the reason that a wire drawn with sharp angles is more rigid than a round one.

Facings.—The selection of facings should be made very carefully, so that as little grinding as possible may be necessary. In point of color a very slight tendency to the darker is advisable, because they sometimes bleach just a trifle in baking. The neck of the facing should be ground very thin so as to overlap the cap, for the reason that it is desirable to bring the neck in close contact with the gum and to cover the labial or buccal surface of the band

with porcelain to avoid or prevent its showing in case of recession. If this joint between the edge of facing and the cap be smooth and continuous it will be found that the tissues take very kindly to it, and seldom present those evidences of irritation and inflammation so often apparent. The main object in overlapping the facing is to securely anchor the body in the joint when fused, for in this connection it must be remembered that there is absolutely no physical union between the porcelain and platinum; and when it is desirable to fuse porcelain over the surface of platinum, to be retained permanently, mechanical means, such as etching or roughing, etc., must be resorted to.

The facing must *always* be soldered to the cap in order to secure the combined strength of this attachment together with that of the porcelain in fusing. In the six anterior teeth the pins must come in contact with the surplus end of post at a point as close to the

FIG. 1.

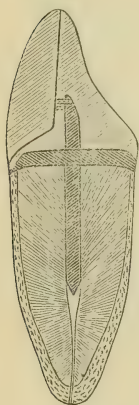


FIG. 2.

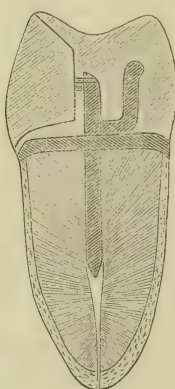


FIG. 3.

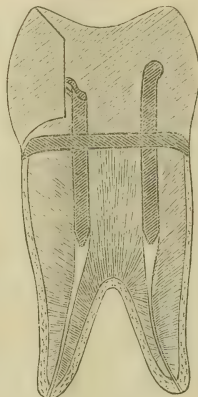
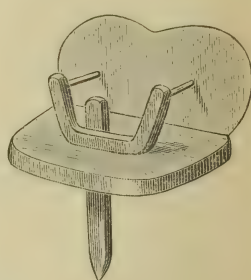


FIG. 4.



floor as convenient, in order that they may allow as much room as possible for the body and in no way interfere with the contouring of the lingual surface of the crown. (Fig. 1.) In some instances they may even be brought into direct contact with the floor and soldered.

In the bicuspsids the same general details apply, together with an additional important consideration, which is that while the porcelain must be securely anchored to the metal construction, it must also be supported against stress and cleavage. Hence it is here necessary to add to the metal parts a support for the mass of porcelain which is to form the lingual cusp. This is obtained by a simple vertical bar soldered to the center of the lingual portion of the cap, extending about one-half way to the occlusal edge of the facing (Fig. 2); or it may be an extension of the lingual post if two posts are used. (Fig. 3.) The end of this extension, however, must *always* be nicely *rounded*, or, acting as a wedge under applied force, it will prove an element of weakness instead of strength.

In the construction of molar crowns one post is all that is usually necessary, and in upper cases should be placed in the lingual

root, while in lower cases in the distal. If a facing is used, which when possible is always desirable on account of color, the supports must be placed in a favorable position to relieve each lingual cusp of strain. (Fig. 4.) In those cases of close bites it may sometimes seem inadvisable to use a facing, in which instances supports may be placed on the cap for each of the four cusps with their ends slightly diverging, so as to anchor the porcelain securely as well as to support it. The entire crown can then be made of porcelain.

Soldering.—In the attachment of the various parts of the metal construction for single crown-work *absolute* contact of the parts to be united is essential, and when the facing is being soldered the entire lingual surface should be freely exposed in the investment. Pure gold can then be used with every assurance of a strong union, even after baking. Only *enough*, however, should be used to make the joint, and it should be well and thoroughly fused that all surplus may become absorbed by the platinum, so as not to remain in globular form to melt and become absorbed under the porcelain during the baking, which invariably causes a porosity.

Platinum and gold solders in various percentages are being extensively used now with a view to uniting the joints with a solder which is not melted at the fusing-point of the body. Such is an advantage in bridge-work where the shrinkage of porcelain materially affects the relation of the parts, but is not necessary in single crown-work. After the soldering has been completed the crown should be subjected to the acid bath, then washed clean in order that no particles of borax or investing material remain to interfere with the vitrification of the body. All sharp angles of metal should then be nicely *rounded* with a disk, as the body will not fuse smoothly over them, and they will prove an element of weakness.

“BODY.”

Since the advent of this work various grades of “body” have been from time to time given us, most of which have met with indifferent success, and many of which have had to do materially with discouragement and failure on the part of those using them. As it is desirable to get the highest combined strength in this work, both in the metal construction and in the porcelain body, the very strongest is a prerequisite.

There are three so-called distinct classes of body,—the *porcelain*, the *mineral*, and the *glass*. Into the two former classes silicon, feldspar, and kaolin enter largely in varying proportions. The so-called *porcelain* bodies contain a larger proportion of silicon, which is practically the most infusible of substances; while the *mineral* bodies contain a greater proportion of feldspar and kaolin. Each of these substances apparently possesses advantages over the others, but, while the *mineral* bodies seem to have a greater density, I am inclined to think that the *porcelain* body possesses greater strength or resistance to stress in the mouth; while for crown-work the third class, or *glass* bodies, which contain kaolin and borax in larger proportions, do not possess strength enough to merit consideration, and are the cause of countless failures. The fusing-

point, or point of vitrification, is regulated and governed by the amount of silicon and feldspar in their relative proportion with borax or "flux," and from my experience I am of the opinion that any "body" vitrifying at a lower temperature than the melting-point of gold cannot be depended upon for sufficient strength in this work. Hence I use the ordinary continuous gum body, which vitrifies at from 2200° to 2500° F., which, because of its superior quality and strength, is the only material I regard as possessing the necessary qualifications for general use. Before using it, however, it is necessary to put it in the mortar and pulverize it much finer, as it cannot be nicely manipulated and carved until this has been done. When reduced to a finer consistence it works, carves, and fuses most beautifully, and no doubt will ultimately be prepared for use in this shape and designated as *crown and bridge* "body." At the present, however, these bodies do not come to us in any variety of colors, so it becomes necessary to depend entirely upon the facings for such.

Applying and Carving the "Body."—First of all absolute cleanliness of the work and of all of the conditions and environments surrounding the place of its execution is highly necessary. The body should be mixed on a clean glass or porcelain slab, with pure, clean water, to a consistence as thick as it can be nicely manipulated. With the work securely held in a pin vise it should be applied carefully, and so thoroughly condensed as to carry it into the most minute crevice and bring the moisture to the surface. This moisture should be absorbed as the building-up progresses with a clean piece of linen or bibulous paper, until the general form with considerable surplus has been obtained. The moisture should be then gradually evaporated until the mass cuts like putty, which, if need be, can be hastened somewhat by slowly passing over a Bunsen flame. The mass is then carved to the desired form and given the proper shape and contour, after which it is ready for the first bake. To obtain accurate results in occlusion the caps, while in the impression, before running the model, should be covered with a thin film of wax, so that when the model is secured they can be easily detached from it and their relation preserved. After the carving has been completed the piece may be placed in position on the model and additions or sacrifices made until a favorable occlusion presents. Two bakes are *always* necessary, owing to the shrinkage; but the outline and general form should be obtained for the first, which is only biscuitied or partially vitrified. And the general contour is easily made for the second bake, which is carried to the point of perfect vitrification, with an allowance for shrinkage.

Prior to building up and carving the work should be fitted on a fire-clay support which will hold it securely and firmly and sustain a perpendicular position, as this is very necessary and can be more easily done before the porcelain is added than afterward, when it should be handled but little.

In instances where it may not be possible to bake as soon as the work has been carved, the form can be preserved indefinitely by placing it upon a well-moistened cloth, which avoids the tendency

of the porcelain to crumble away when too dry. The carving itself is a very simple procedure, and with a little practice in carving in plaster very artistic work can be done with dexterity. Five lines will typify any tooth nearly enough to be distinguished.

Baking.—The work should be heated up slowly to avoid the expansion incident to a too rapid evaporation of the moisture, and watched carefully from the start until finished. There are many tests for ascertaining the exact time of complete vitrification, but none are necessary or absolutely accurate, and fusing porcelain is much a matter of experience.

The fusing-point of a globule of pure gold placed alongside of the work denotes very accurately the average time necessary for a good first baking in any furnace, but from then up to the desired vitrification for the finished work the eye must be trained to distinguish, as different furnaces and different currents vary from time to time. It is easy to train the eye to discern this point in fusing without reference to time or tests if one will experiment a little and manifest no hesitancy in opening the furnace and looking at the work as the point of fusing is reached, for there is no danger attending this procedure if no draft of air is in the room.

The failures which accrue from the baking of porcelain, while many times due to the presence of dirt, borax, or foreign substance on the work, to too much pure gold, and to too rapid heating, are due more to *overfusing* than to anything else, as this completely destroys the color, beauty, integrity, and strength of the work.

When the baking has been successfully accomplished, allow the cooling to take place slowly, to avoid too rapid contraction; and then nicely finish the exposed surface of the platinum with disks.

Facilities for Fusing.—But a brief retrospect will enable us to appreciate the marvelous improvements made in the facilities for doing this work in the last few years, and to these improvements more than to anything else is due the success attending the use of porcelain. Since the advent of the electric furnace, the coke, gasoline, and gas apparatus have been almost entirely superseded, and the noise and dirt incident to their use is no longer a menace.

Most any one now, whether located in city or town, can do this work without loss of time, and without objectionable features. Some, it is true, who may be located in small towns, where they have only the night current, may be compelled to do their baking after the busy hours of the day are over, while others in still smaller places, where there is no supply of current at all, may have to depend upon gas or gasoline, which are the most successful means next to electricity.

The question of the best electrical furnace is much a question of opinion and individual preference. All of them are eminently successful in the uses for which they are intended in the proper hands.

Mounting.—The subject of mounting has recently been attracting considerable attention, because of the agitation of gutta-percha as a retaining medium in preference to the process of cementation.

Were it possible for every one to successfully manipulate gutta-percha, the advantages of ease of removal, insolubility, and the

cushion-like effect afforded would render it practically the ideal method, but, unfortunately, it is a difficult matter to successfully and thoroughly manipulate it in extensive cases, and even requires considerable time and much painstaking effort in single crowns.

I usually give preference to cement, but always observe the precaution of coating the interior of crown and post with a thin film of chloro-percha or gum shellac; either of which facilitates removal in case of necessity.

In conclusion permit me to say that every progressive dentist should do porcelain work, for, if the application be judicious and the execution skillful, the result is indeed ideal; and also that I have taken the liberty herein of quoting freely from previously published articles of my own upon the subject.

SOME PHASES OF MUMMIFICATION.

BY E. R. WARNER, M.D., D.D.S., DENVER, COL.

(Read before the International Dental Congress at Paris, August 8, 1900.)

THE term "mummification" has been applied in a general way to those cases in which devitalization of the pulp has been pursued, and a constriction and coagulation of the tissue into a leathery mass has been secured. The practice has been to remove the coronal portion of the pulp and then apply a paste of the supposed necessary ingredients to the stump of the remaining fragments, covering the same with a cement prior to the insertion of a metallic filling in the external cavity. Methods that have merit will justly be transferred from the theoretical to the practical field. Methods that compromise the extremists do much to give the best average results. For twenty years we have had records of what was formerly supposed to be a restoration to health of pulps after exposure or amputation, but which modern investigation insists were frequently cases subsequently devitalized and kept from putrefactive changes by media preventing bacterial infection.

The conservative man takes issue with what he calls a radical operation, and one uncertain in its permanent helpfulness. While he recognizes the impossibility of thorough removal of tissue from the apex of a constricted or tortuous canal, he strongly opposes any method short of an attempt at absolute removal of pulp and the filling of the canal with an impervious substance. The enthusiast sees in this operation possibilities innumerable. Cases in teeth offering obstacle after obstacle were reduced to simplicity. He reasoned that if the operation was good for the inaccessible it was likewise good for the accessible, and its application was made everywhere. There is merit in a happy medium. Viewing the work from a practical standpoint, some of the principles in the current methods may be commended, but others should be censured as unworthy of a following. The theory that a mummified or constricted pulp acts as a canal filling should not be accepted as truth. If contraction has taken place to fifty per cent. of its former volume, then it

does not fill the canal, and does permit the contents of the tubuli of the dentin and the region of the apex to be subjected to outward disturbances. These tubules filled with organic matter may be considered minute pulp-canals, and should therefore be treated in a manner preventing future trouble from this source.

Whether we examine the embalming processes of the ancient Egyptians in preserving many of their bodies to the present day, or the tanning process of our own generation, whereby the animal tissue of hides is transformed into the resisting substance of leather, we must certainly agree that, within the canal of a tooth, if we subject the organic tissue to the action of an astringent and incorporate into its substance an antiseptic, we can secure a degree of immunity from subsequent infection. Environment has much to do with success. The constant presence in the mouth of fluids containing bacteria and the possible dissolution of the antiseptic where a barrier is weak may permit invasions of the apical region.

The present system of so-called pulp-mummification may be commended, in that it does shorten the time required and gives a comparatively quiet tooth for months and possibly years to come. It is to be hoped that the fears entertained may prove groundless, but time is the important factor that determines the value of any system. No operator denies the advantages gained by the complete removal of pulp and absolute filling to the apex, but the mechanical difficulties attending such effort are the obstacles which we are desirous of overcoming. No short road to possible success should, however, be given consideration if the future usefulness of the tooth is to be in question. Where no outward attack can be made upon the soft material within a tooth, an impervious condition existing, no harm may come; but where there is possibility of an inroad of caries from a vulnerable portion of the tooth into the pulp-chamber then the paste material or any substance of such consistence may be subject to destruction.

Again, the system might be condemned in that it offers so great inducements to the unscrupulous operator to carelessness in the *modus operandi* in his vain endeavor to reap the rewards of a quick and possibly painless operation. From various sources now come the advertisements of men who exclaim "Eureka!" having discovered a substance whereby by means of a mere excavation of external caries after an arsenical application and the substitution of their remedy the tooth can be preserved from pericemental trouble for all time to come. Caution is commended to those who are wont to grasp that which seems so easy and positive.

The apparent popular remedy of the day is that advocated by Söderberg, containing alum, thymol, and glycerin, made into a paste with oxid of zinc. Modifications have from time to time appeared since the formula of Witzel. Reference may be made to the suggestion of Miller as to bichlorid of mercury and of formaldehyd by Boennecken. In all these remedies certain underlying principles are recognized as essential in acting upon the tissue permitted to remain: Complete devitalization of pulp; incorporation into its substance of an antiseptic sufficiently penetrating to be

gradually absorbed and yet not so diffusible as to quickly disappear; the use of an astringent or coagulant to create a denser mass and make the tissue insoluble; the use of substances preventing as far as possible the irritation of the pericemental membrane or the discoloration of the root.

My experience has been chiefly with the alum, thymol, and glycerin, with the occasional use of formaldehyd. Indiscriminate use of the method has not been made, however, but with selected cases that could from time to time be observed. Experience has taught me that pericemental irritation is less likely to occur if the arsenous acid is permitted to cause death of pulp to the apex before applying the chemical agents. Many cases of neuralgia in apical filaments are doubtless due to the action of these agents upon the semi-devitalized tissue. It is true that the anodyne action of cocain can be secured, but that is only temporary; so that it is preferable to have complete destruction and cauterization of tissue.

The pulp should certainly be removed from the accessible canals, and if any leniency is shown in allowing tissue to remain, it should be in the apical half of the smaller tortuous ones. It is in the tissue of the larger canals that I believe lies the subsequent danger of greater trouble, and therefore if they are as completely cared for as possible that danger is eliminated, and we can apply the mummifying agent to the filaments in the canals that present difficulties of mechanical cleansing. In the smaller canals it is desirable to enlarge slightly one-third or one-half the distance to the apex with Gates-Glidden reamers, leaving the terminal filaments untouched if deemed well not to remove them. This gives a pocket which facilitates application of the filling-material over the canal. Desiccate with absolute alcohol, and with cotton fiber on a broach moisten the canal with the required agents, which have been rendered more fluid by the addition of glycerin, and fill with a gutta-percha cone in the usual manner, forcing out the excess. Fill the pulp-chamber with an impervious cement, and complete the external filling as desired.

The aim of this paper has not been to present new remedies, but to state what practical experience has shown will be helpful in the current methods of an operation having so important a bearing upon the teeth of the future.

Principle underlies any system, and the ingenuity of the operator is called upon to work out the details.

OBLIQUE-ROOTED MAXILLARY TEETH.

BY WM. BOOTH PEARSALL, F.R.C.S., DUBLIN, IRELAND.

(Read before the International Dental Congress at Paris, August 8, 1900.)

THE maxillary permanent molars have long been considered by our best dental authorities to be comparatively free from changes of form, and to present normal anatomical characteristics.

It has been my good fortune to be the first to describe a form of abnormality of the roots of the first and second molars of the

maxilla which had not hitherto attracted any attention from dentists engaged in active practice. I have therefore brought this abnormality before the International Dental Congress of Paris in the hope that deficiencies in the scope of my observations may be filled or supplemented by more skilled observers.

I have on three occasions brought this subject before my professional brethren. First in December, 1888, in the Royal College of Surgeons in Ireland. I was then able to show fourteen specimens. Before this time I had been able only to see four specimens in a period of twenty-two years.

Second, in August, 1891, I brought the subject before the British Dental Association in London, when I was able to exhibit nearly sixty specimens. Third, in order to learn if this abnormality was known to our American brethren I read a further communication on the subject before the Chicago Dental Society in October, 1898, during a visit to that city.

My attention was first directed to this remarkable variation from the normal permanent molar in 1866, thirty-four years ago, and I have collected teeth exhibiting this peculiarity ever since, so that, owing to the kind help of my professional brethren in different places of the British Isles, I have been able to make a collection of many specimens.

I have made a careful study and comparison of the collection of specimens, and will now describe the most characteristic varieties I have been so far able to gather.

The normal position of the roots of the human anatomical maxillary molar tooth may be taken as falling within a space bounded by an isosceles triangle when they are cut close to the crown at the trifurcation.

The abnormal teeth I have the honor to bring under your notice will be found to show a different arrangement of their roots. The neck of the tooth appears to have become flattened and the distal root slid in, so that the roots will be found to occupy a space bounded by a scalene triangle when their relative position is studied close to the neck of the tooth.

These first and second oblique-rooted permanent molars may be divided into three types:

Oblique type A. Molars with three separate roots.

Oblique type B. Molars with two separate roots.

Oblique type C. Molars with one root.

These three types may be conveniently divided into classes.

OBLIQUE TYPE A. MOLARS HAVING THREE SEPARATE ROOTS.

Class 1. Molars with diverging and curved buccal roots.

Class 2. Molars with slender and parallel roots, but slightly curved.

Class 3. Molars with converging and curved buccal roots.

Class 4. Molars with the tips of the buccal roots bent backward. This molar is not commonly met with.

OBLIQUE TYPE B. MOLARS WITH TWO SEPARATE ROOTS.

Class 5. Molars with the *distal* buccal root united with the

lingual root by a process of dentin, forming a broad but thin root. This root has a well-marked notch between the apices of the buccal and lingual roots.

These oblique-rooted teeth are to be found among deciduous molars.

Class 6. Molars with the *mesial* buccal root united with the lingual root. The distal buccal root is usually small and curved. This abnormality I consider to be rare, as I have only been able to gather two specimens, and have never seen it among deciduous oblique-rooted molars.

Class 7. Molars with the mesial root united with the lingual root, but without any notch between the apices of the united roots. The roots end squarely.

In some aspects this tooth resembles a fur mitten, such as is used for driving in severe cold weather.

Class 8. Molars with the mesial buccal root much curved. The distal root is united with the lingual root, and forms a tapering root bent in the lingual direction.

The mesial root is bent in the buccal direction.

Class 9. Molars with roots having pointed apices and with the roots laid close together.

Class 10. Molars with the buccal roots united while the lingual root is separate.

OBLIQUE TYPE C. MOLARS WITH ONE ROOT.

Class 11. Molars with all the roots fused together, while the section at the neck retains the scalene figure.

It is to be noted that the crowns of these first and second oblique-rooted molars do not as a rule present any departure from the normal anatomical crown. Hence the peculiarity of the oblique position of the roots of these teeth is not usually observed by the dentist in the mouth before proceeding to extract them.

I have described these oblique-rooted molars because these types and classes of teeth are difficult, if not impossible, to extract by routine methods.

I cannot regard these oblique-rooted teeth as very common, although I have succeeded during the past ten years in collecting many of them. One may practice for years without meeting one. Most of the specimens I have collected gave trouble to the dentists who extracted them.

I have given the name "oblique-rooted" to these teeth owing to the difficulty of fitting or grasping them with the ordinary extraction forceps.

Of all our dental authors Sir John Tomes is the only one who seems to have figured this tooth, but he has not described its peculiarities. He says,—

"Among the molar teeth, the first permanent molars will be found to be the most constant, and the third the least constant, in the number, shape, and position of their roots. Three may be regarded as the typical number of the roots of the upper molar, and two as that of the lower molar teeth. Now, although we find occasional excep-

tions to these rules in the permanent molars, they are very unusual."

In 1893 my attention was directed to the occurrence of the oblique type B among deciduous maxillary molars, and I have gathered examples showing this abnormality in both of the maxillary molars. The occurrence of this variation in root form in deciduous teeth, which are commonly believed to be almost free from abnormalities, would point, in my opinion, to a survival of a peculiarity from a distant point of time.

I have made careful examinations of skulls in such ethnological collections as I have been able to have access to, and I have found oblique-rooted permanent teeth in Eskimo, Chinese, Italian, Russian, French, German, and Egyptian mummy skulls. Professor G. V. Black, of Chicago, considers these teeth to be rare in his experience.

Dr. Nevius and Dr. Sionaker, of Chicago, who devote their entire attention to the extraction of teeth, have both informed me that they have rarely met with them in their large practices.

In 1866 the first example of this peculiarity came under my notice. On an October afternoon in that year a gentleman came and begged me to extract a tooth that had given him great pain, and which had just been broken by another practitioner who had informed him "that the devil himself could not get it out."

The patient was both observant and intelligent, and informed me that he noticed before the crown smashed, as the blades of the forceps grasped the tooth, the instrument slipped round the tooth.

This happened a couple of times, and made him determine, if the operation was a failure, that he would seek help elsewhere. After such a statement I need not say I examined the tooth minutely, and found the palatal portion of the crown broken. The gum was torn and bruised. As the broken tooth appeared to offer sufficient support for the molar forceps, if carefully adapted, I tried with great caution to grasp the roots with the forceps. The rotation of the beaks of the forceps round the tooth was so marked that I desisted.

On examination I found that there was a change of form in this first molar, and I determined to use the elevator. The resistance was considerable. Much to my relief, and greatly to the delight of my patient, the damaged tooth was dislodged from the socket and removed from the mouth.

Some three or four years afterward another case came under my notice with the crown crushed off by another operator. I removed the roots by means of the elevator. The patient had been with a competent and experienced operator, who said, "All the art of man would not extract *that* tooth."

I need not detail particulars of other cases I have met with, but I would strongly advocate that deliberate examination of the offending tooth should in all cases be resorted to before extraction.

I do not think any one possessed of even moderate experience will ever forget the unpleasant sensation he feels when trying to grasp one of these teeth in the forceps in the effort to dislocate and

remove the tooth from the socket. The blades of the forceps revolve round the neck of the tooth in the act of closing them. If you replace them and try again you will find that the blades have found their way almost to the antero-posterior diameter of the tooth. The tooth feels to have become too small to be grasped by the forceps. The operator also feels, on closing the forceps, that the tooth revolves in the socket, yet cannot be removed from the jaw.

A large upper bicuspid forceps is the best to use for extracting such teeth. With one blade placed on the mesial buccal root and the other on the lingual root a very firm purchase can be made.

Care should be taken to see that the crown of the tooth is not touched by the blades, but that the grasp of the forceps is at the neck of the tooth.

The elevator is, I consider, the most useful instrument in skillful hands, as these teeth can be prized out of their sockets without undue force or risk to the surrounding parts.

THE STATUS OF OPERATIVE DENTISTRY IN 1900.

BY L. G. NOEL, M.D., D.D.S., NASHVILLE, TENN.

(Read before the National Dental Association, July 10, 1900.)

Nor long since one of the most prominent old practitioners in the South, in writing of the present status of operative dentistry, made the broad statement that the art of filling carious teeth with gold has reached the acme of perfection. This was to me a somewhat startling announcement, and one the truth of which I am ready to question. In the first place, I doubt if the manufacturers have entirely perfected themselves in the art of refining and preparing gold for the use of the dentist. Granting that they may have very nearly succeeded in producing absolute gold for dental purposes, there may yet be much to learn about the physical properties of the metal which is destined yet to simplify and make easier to both patient and operator the manipulation of this noblest of filling-materials. When we contemplate the labor and difficulty of making large fillings with gold, we cannot think that the highest state of perfection has been attained. Surely some method will be devised, some preparation of plastic or crystal gold invented, that will enable us to fill cavities more rapidly and more perfectly, perhaps, too, with less force, and consequently with greater ease to the patient. This, then, is one of the urgent needs of the twentieth century. We doubt not that the ingenuity of man will rise to the occasion and supply us with such preparations of gold as we need. This was foreshadowed when three or four years ago at the clinics at this place (Old Point Comfort) half a dozen different preparations of gold foil were exhibited, and manipulated by as many different operators.

We do not think it too chimerical to indulge the hope that the objectionable color of gold foil may yet be overcome without de-

stroying its valuable physical properties, and that we may one day have this precious metal prepared for us in various shades to match the color of the teeth. A feeble attempt to meet this want has been made in the platinized gold, and, building on this idea, some one may yet master the color problem. Our literature has for a year or more been manifesting the general dissatisfaction existing among our more artistic operators over the display of gold in the visible teeth, and the fight that is being waged against the practice of making gold crowns and large contour fillings in such teeth is likely to be kept up until we attain to better methods and better materials. We can but think that the porcelain fad is likely to be carried too far, but such is always the case with every good thing; its use is likely to be carried to the extreme of abuse. This is the most artistic material for buccal and labial cavities, but we cannot approve of porcelain fillings for the grinding-surfaces of the molars and bicuspid; for here color is of little importance, and gold seems to meet all the real requirements in these situations. But for cavities upon the visible surfaces of teeth we hail with delight any material that will meet all the requirements, as does gold (or better than gold), and in which we may match the various colors of the human teeth. That this art of porcelain filling may ever be so perfected as to render it adequate to the requirements to be met in approximal fillings remains to be seen. Having unbounded faith in the ingenuity of dentists, we confidently indulge the hope that this may be perfectly accomplished.

We likewise soar upon the tireless wing of faith to the sublime hope that the cements may be so perfected as to supersede all such difficult methods. That cements are to be greatly improved we confidently expect, because we have only to measure the betterment of the past two decades with the status of this material back in the 70's to find great encouragement for the future. The excellent essay on cement presented at our last meeting at Niagara, describing the practical tests made by the writer (Dr. Wedelstaedt) to show the relative permeability by moisture of these materials, was a great stride in the right direction. These simple methods of testing cements have doubtless been useful to hundreds of dentists through the past year, and we must have more work along these lines. We hope to have yet much valuable work and instruction about cements from such men as Flagg, Black, and others, but it is to be hoped that our young chemists on both sides of the Atlantic will take up the work and keep it up until something definite is arrived at, until we shall no longer hear from men like Drs. Black and Flagg such statements as they have been making in regard to the unsatisfactory state of their knowledge of these cements. The instability of the fluids of oxyphosphate cements—the tendency of these fluids to undergo chemical changes, rendering them unfit for use—has always been a sad defect, rendering them untrustworthy, and relegating them to the domain of the temporary.

The work that has been done on dental alloys has been truly enormous, and the profession should ever honor and revere the men who have given so much of their lives to the study of the combina-

tion of metals for this purpose. We shall not attempt to mention these men by name, for obvious reasons. They are well known to you. The work they have accomplished, we say, has been prodigious, but when we compare the teachings of the leaders in this field we find so much variance that we are brought to the conclusion that, great as has been the work, it is small as compared to that which remains to be accomplished. The majority of workers in this field agree upon certain points which have been observed, and we think these may be recorded as scientific facts; and from these we may work forward through the mass of observations, of which we may say that we have no majority agreement, until we shall have reconciled all conflicting opinions and laid these new conclusions aside as so much additional scientific truth. There seems to be a majority agreement that the proportions of silver and tin giving the best results are, in one hundred parts, about as follows: Silver, sixty; tin, forty. The majority agree that an increase of tin above this proportion will retard the setting, increase the shrinkage, and increase the tendency of the material to undergo those slow changes of shape that have been called spheroiding by Dr. J. Smith Dodge, but which Dr. Black has denominated "flow."

Again, the majority agree that the addition to these relative proportions of silver and tin of a small quantity of copper or a small quantity of gold will still further hasten the setting and lessen the shrinkage. This will give us as a formula for a three-metal alloy: Silver, sixty; tin, thirty-five; copper, five; or silver, fifty-seven; tin, forty; gold, three.

Again, it is the consensus of expert opinion that the addition of a small quantity of zinc, say one and one-half to two parts to one hundred, to an alloy of above-named relative proportions will still further hasten the setting, improve the color, and prevent the shrinkage.*

The experts further agree that an alloy works better and produces better results when it has been cut and laid away for some time than when worked immediately after cutting. This has been called "aging"; and since it has furthermore been observed that the same effect may be produced by subjecting the freshly cut alloy to gentle heat or gentle friction, the term "annealing" has been proposed in its stead.

It would, we think, seem more probable that the mercury would unite more readily and thoroughly with the freshly cut particles of the alloy than after their surfaces have become tarnished by union with sulfur, oxygen, and other gases in the atmosphere, but when the consensus of opinion of expert investigators decides a question as this has been decided we must accept the teaching until it can be shown by unanswerable scientific demonstration to be false.

The above are examples of conclusions that we think may be accepted as facts with regard to dental alloys. We shall now proceed to give some examples of differences of opinion between the experts:

*The above formulæ are hypothetical, and not stated as good practical proportions.

(1) There appears to be no agreement as to the best method of fusing together the metals in making alloys, some contending that the tin should be first melted, then the silver added, and lastly the gold, copper, platinum, and other high-fusing metals. The "new departure corps" pour together from a tin scoop the commingled metals into a crucible that has been heated to receive them and well coated with melted borax to prevent the absorption of the metals by the porous vessel.

(2) The differences of opinion about formulæ are endless, and there are numerous differences as to the effect upon alloys of the introduction of small quantities of certain metals,—*e.g.*, some claiming that platinum added in small quantities, say one to three parts in one hundred to almost any silver-tin alloy, will hasten its setting, improve its edge strength, render it easier of amalgamation, and improve its color. Other eminent authorities (notably Dr. Flagg) deny all these assertions about platinum, and substitute negative statements on each point, adding that platinum is detrimental, rather than beneficial, to any formula.

(3) There is also much diversity of opinion as to the best method of mixing amalgams. Some authorities advocate ascertaining by experiment the amount of mercury required by any particular alloy to obtain the best results, when the relative proportions of alloy and mercury may be weighed out with a delicate pair of scales. It is claimed that better and more uniform results are obtained by placing at once together in the palm of the hand the right quantity both of alloy and mercury, and kneading them into a plastic mass. Some advocate a thorough trituration in a mortar so as to break up the particles of alloy and bring about a complete melting of it in the mercury. Others think the mortar and pestle useless, and various methods of mixing, such as shaking together in a bottle, hand mixing, etc., have each their advocates.

(4) Some recommend washing the alloy with diluted sulfuric acid, then with soda or ammonia to remove the acid; then amalgamate and rub in a mortar with alcohol. By this process it is claimed the same results may be obtained with freshly cut alloys that can be obtained with alloys that have undergone the aging process. They do not undertake to explain how the acid produces this result; whether it is brought about by the tarnishing of the surfaces of the particles of the alloy by the coating of metallic sulfids thus formed, or how. The fact is merely stated, and presented unexplained.

(5) Authorities differ again as to the methods of manipulating the various amalgams into cavities, some recommending smooth points, some preferring serrated; some using hand pressure, some the mallet; some confining the material in approximal cavities by applying band matrices and leaving them in place until the material sets. We believe we may say that the consensus of expert opinion is unequivocally favorable as to the immense value of amalgams in dental practice, and, while a minority of highly respectable practitioners claim they have no use for amalgam, and do not use it, the majority of dentists consider it a blessing to the human race. A

certain class of medical practitioners (mostly homeopathic) make much trouble for the dentists by telling patients they are being poisoned by the mercury introduced into the system through the amalgam fillings in their teeth, and that certain forms of throat inflammation and nasal catarrh are caused by the mercury absorbed from these fillings. We are sorry to say there are dentists in every community ready to profit by these suggestions from the homeopathic doctors and remove all such amalgam work, substituting gold fillings, gold crowns, and gold bridges for many good amalgam operations that would, if unmolested, do good service for many years. As before remarked, these charges made against amalgam are not sustained, and through a period of twenty-five years of continuous practice the writer of this paper has not observed one single case of pytalism, throat affection, or any form of neurosis that could be clearly attributable to mercurial poisoning from amalgam. As an index to the status of the profession on this subject at the present day, we cite the paper of Dr. Grady before the union meeting at Baltimore, and the discussion which followed its reading; also an editorial under the caption "Professional Ignorance," all of which are to be found in the January number of the DENTAL COSMOS for 1900.

We cannot leave this part of our subject without again adverting to the hurtful commercial spirit which prompts the crowning of many molar teeth that could be made more serviceable and comfortable by filling properly with amalgam.

Another crying evil of the present day that needs a severe rebuke is the practice of using non-cohesive gold in the occlusal surfaces of the molar and bicuspid teeth. This mistaken use of non-cohesive gold is frequently made by practitioners who do much good service with it on approximal surfaces, where, from the small amount of friction and attrition it there has to sustain, and for other obvious reasons, it is in many instances preferable to cohesive gold. *We believe the consensus of expert opinion is in favor of cohesive gold for cavities on the occlusal surfaces of the molar and bicuspid teeth.* The cases coming under the observation of the writer where non-cohesive gold has been used in this class of cavities have presented so many failures, so many leaking fillings where particles of gold have come away, or worn away, that we have been led to condemn the practice as untrustworthy, and one belonging to the effete past.

We are led next to inquire into the status of root-filling. With this operation as it is being performed at the present day we have less satisfaction than any other operation in dentistry. The practice of filling roots with oxychlorid of zinc and cotton fiber is faulty in the extreme. The waxes and resins are difficult to introduce, and deceptive. The same may be said of all the metals, and all forms of metals. Metallic wires are likely to pass beyond the apices of the roots, causing the loss of the teeth. Gutta-percha would be an ideal root-filling if easy of introduction, and if the operator could be sure of perfect adaptation. We believe this material is more favorably regarded by the expert root-fillers than any other, but no form of gutta-percha point has yet been devised having sufficient

stiffness and flexibility. We find a sealing up of the apical portion of the canal with chloro-gutta-percha and aristol before introducing the points a good practice, but the uncertainty of effecting a perfect closure of the canal with gutta-percha leaves us still looking for a reliable root-filling.

Three years ago the idea occurred to me to try the thorns of the prickly pear for filling root-canals. This is a cactus-like plant indigenous to the limestone region of Kentucky, Tennessee, and Northern Alabama. Its leaves bear a great many hard, flexible thorns, presenting a great variety of sizes that appear to have been designed by the Creator especially for this purpose. These have been found very satisfactory for filling small round canals, such as we find in the incisors and bicuspid; and sometimes they are serviceable for the canines and upper molars. They should be soaked in creasote before using, and it is best to set them in chloro-gutta-percha. This should be prepared by dissolving forty to fifty grains of aristol to the ounce of chloroform, then using this as a solvent for the gutta-percha. This is to be smeared upon the walls of the root-canal with a smooth platinoid broach. The thorn may be dipped into the solution, and then forced up until it fits the canal tight, when the fibrous portion is to be twisted out, or, if necessary, burred out. This method has been in use in my practice for about three years, and, as far as I have had opportunity to observe, my cases appear to be entirely satisfactory. I have never had an abscess follow after this process of root-filling. It is not suited to all cases, and must not be employed except in cases where the canals are normal and can be almost exactly fitted with the thorns. This method is not suited to canals that have become patulous by chronic abscess, nor to the flattened canals of the anterior roots of lower molars, for obvious reasons.

I have experimented in a few instances with the operation spoken of as pulp-mummification, and the few cases in which I have tried it have been so far satisfactory as to lead me to look to it with hope as to its becoming an established practice for the third molars and for many teeth with crumpled and malformed roots. A lower third molar in my own mouth presenting the peculiarity of having one canal containing a living pulp, the others being dead, was treated by this process last January, and is perfectly comfortable. In all of my cases I have used the prescription of Dr. Söderberg, of Australia, following the details described by Dr. O. E. Houghton, of Brooklyn, in the December number of the *Items of Interest* for 1899.

Before closing this paper I want to say that as I grow older in the practice of dentistry I become more and more enthusiastic about the practice of obtaining space for all approximal fillings by wedging apart with rubber, cotton tapes, cotton, wood, etc., previous to the operation of filling, and thus preserving and restoring the contour of the teeth.

Another conviction that has been gaining strength as years have passed has been that we on this side of the Atlantic have all been using too much gold in the incisor teeth, especially for our delicate female patients. When the enamel is sufficiently unbroken to pro-

tect cement from friction in biting, it is a better preserver of these teeth than gold, and a better conserver of color. Since cavities are never extended by recurring decay where cements are employed, we believe a good quality of cement carefully manipulated may be considered as *permanent* as gold, while it is certainly superior as a stopping for arresting decay under the conditions above mentioned.

THE MECHANICAL FIXATION OF TEETH LOOSENED BY DISEASE.

BY FRANK G. GREGORY, D.D.S., NEWARK, N. J.

(Read before the National Dental Association, July 10, 1900.)

FREQUENTLY there is presented to every dental practitioner a class of patients who, for years perhaps, have been troubled with teeth so loose and diseased that it would seem almost useless to attempt anything in the hope of retaining them and restoring the teeth to usefulness. Any resort resulting in a favorable solution of this difficulty always gives the operator a sense of satisfaction, and the patient renewed confidence in the dental profession. Recognizing the value of retaining teeth in a position somewhat suggesting the natural stability of the individual tooth, thereby reducing the susceptibility to inflammation, many commendable devices have been introduced prolonging the usefulness of greatly impaired teeth, restoring the masticating function for a greater or less time. There is objection to some of the devices because of the amount of time, labor, or skill required to produce a satisfactory appliance. Then, too, the great display of gold is so serious a disfigurement as to render it inapplicable. In determining the proper appliance that shall serve, many things must of necessity be taken into consideration: among them the utility of the piece, the esthetic and prophylactic prognosis; and there should also be an opportunity for an easy access to the tissues, allowing such treatment as is required to keep the parts under a favorable influence. These seem to me the most vital.

In the hope of meeting these demands, a fixture to be described seems devoid of many objectionable features, and commends itself for its simplicity of construction and ready adaptation to the various conditions presenting in either the upper or lower jaw. A case not so commonly encountered, but involving the many difficulties likely to be introduced, will serve to illustrate the *modus operandi*. An upper denture, teeth exceedingly prominent, the incisor teeth, especially the centrals, very loose, and the temptation to extract strengthening as we study the case; but ten of the teeth remain, and these articulate imperfectly with the lower ones, bringing undue stress upon the weakened incisors, preventing the proper mastication of food. After having the irritation reduced and the discharge of pus greatly lessened, the teeth were ligated so as to articulate to the best possible advantage. An impression was taken carefully, and the patient dismissed for the time being. Disks of pure platinum were burnished to the palatal surfaces of the incisors, extend-

ing from the cutting-edge slightly under the free margin of the gum and about one-third the antero-posterior thickness of the tooth. A gold crown was fitted to the first molar on each side, dummy bicuspid added, half-round clasp wire (gauge 14) shaped to conform to the palatal surfaces of the six anterior teeth, and connected with the disks and crowns, using sufficient solder to make the piece rigid, but with a springy quality. Before removing the piece from the cast, the position of the pins to retain the fixture was noted and holes drilled. The piece was then placed in position, cementing the crowns and disks, and the incisor teeth were ligated temporarily while the setting of the oxyphosphate took place. This accomplished, holes were drilled into the teeth at the points where the disks were perforated; two holes in teeth having living pulps, and three holes where the pulps had been removed. These holes were made at obtuse angles, in order to gain strength and prevent the parts from working loose. After countersinking the hole in the metal, the tooth was tapped to receive a headed platinum pin carefully threaded. After making a groove in the head of the pin, some thin oxyphosphate was introduced into each hole prior to driving the screw home. After many months of use, the patient frequently reporting for inspection, the results accomplished are certainly encouraging.

There is every reason to believe a most successful issue can be derived from even the most hopeless cases, and where conditions are more favorable very gratifying results can be obtained. With such a device there is no foreign substance exposed to view, the enunciation is not interfered with, the articulation is greatly improved, and those peculiar characteristics giving personality and distinctiveness to the individual not only preserved, but very greatly enhanced.

POPULAR DENTAL EDUCATION.

BY J. PERCELL CORLEY, M.D., D.D.S., GREENSBORO, ALA.

(Read before the National Dental Association, July 10, 1900.)

THE present century has witnessed the evolution of dental art from a trade to a profession; the growth of dental practice from an empiricism to a science. The classical beauty of operative technique, in the present system, touches the ideal. The exquisite fineness of manipulative skill finds, in modern dental surgery, its climax.

The dignity and importance which are accorded to the dental profession attract men of scientific ability, tone, and intellect; while social distinction and lucrative remuneration fills its ranks with commercial charlatans, running the gamut from the street faker to the polished dental surgeon.

The "blacksmith-barber" dentist served his day and generation, and passed to his reward. Then came the vanguards of the present régime, each crystallizing into building stones his own with his ancestors' thoughts, until a colossal structure challenges the ad-

miration of the world. The present status of the profession is a monument to the unselfish labor and untiring zeal of those whom we delight to call the "fathers of dentistry," some of whom still live and labor among us.

Following the course of nature, increase of importance and power brings additional responsibility. The fundamental source of this evolution has been, of course, individual effort. But the three great factors have been the college, the journal, and the association. All of this education has been exclusively for the dentist. No measure, further than the possible exception of an occasional chapter in a few text-books, has ever been undertaken for the instruction of the public. This, then, we shall assume, is the dentists' burden.

It is a fact, conceded by the profession, that every son of Adam's race is entitled to a perfect denture, and that he should carry the same to his long home. However, we find not one full denture in ten, and not one *perfect* one in one hundred. Is this because our knowledge of prophylaxis is deficient? Not at all. But it is due to the ignorance of the laity.

In the best-regulated practice patients often present with abscess from deciduous teeth, first molars with exposed pulps, incisors requiring contour fillings, gums and alveoli ruined by calculus, irregularities which have grown to deformities, and many more irreparable defects. Advice is sought too late. The only remedy now is *patchwork*.

Despite all the education which the public gets at the dental chair, the manufacture of forceps and artificial teeth continues; but the lack of a knowledge of oral hygiene among the people is self-evident. Its need cannot be doubted.

Canada and many of the European countries have laws which prohibit admission to the public schools of children who have decay or disease in their mouths. With our republican form of government, however, we cannot secure such legislation until the public realizes the importance of the measure. And, indeed, were it a statutory requirement, the law could not be enforced without the sympathy and co-operation of the people.

There has been, from time to time, a desultory distribution of tracts, pamphlets, and papers containing information on the care of the teeth, but, having no influential authority to recommend them, they have made little impression on the laity. No organized effort to present the subject of oral hygiene to the people of the United States has ever been made. The difficulty of the undertaking is surpassed only by its possibilities for good.

A plan which seems to be the most practical yet proposed is one which the Alabama Dental Association adopted at its last meeting. The association assumed the responsibility of educating the people of its own state. A "Ways and Means" committee was appointed, with authority to employ and equip a lecturer whose duty shall be to make, under the auspices of the association, a tour of the state, lecturing to the public in such places as the committee may direct.

This "Ways and Means" committee proposes to make the scheme self-supporting. Every section whose local dentists will contribute to the Finance Committee a sufficient amount to defray its expenses will have a share of the lecturer's time.

If such a work could be organized throughout the United States, the increased demand for dental services would give ample employment to all the operators now in the field. The cry for cheap work would cease. The conditions which make the reign of the charlatan and quack would no longer exist. He would thus be either whipped into line or relegated to the rear. The splendid results would replenish our ranks with the choicest *personnel* from the scientific realm.

The lecturer could be equipped with a stereopticon, drawings, models, etc., and could prepare lectures for mothers, school children, and the general public. Being an employe of the association, he could do evangelistic work among the dentists, thus strengthening the organization.

An intelligent man doing this work could feel the public pulse, and would soon be able to formulate and compile a work that would be a valuable contribution to the family library, as well as to the public and high-school curriculum.

The possibilities of such a scheme are great; the more it is studied the more it grows. May I ask that the National body consider the matter, and if it pronounce the plan a wise and a worthy one let it officially indorse the action of the Alabama Association; and, also, let there be appointed a standing committee to champion the cause of popular dental education.

A SYSTEM OF REMOVABLE BRIDGE-WORK.

BY W. E. GRISWOLD, D.D.S., DENVER, COL.

(Read before the National Dental Association, July 10, 1900.)

THIS is a method embracing the good features of the system now in use, with the addition of facilities of removal for repair and thorough cleansing. It also affords the opportunity for restoration of contour of the soft tissues, and thereby producing more natural and artistic effects. The excessive display of gold is also obviated.

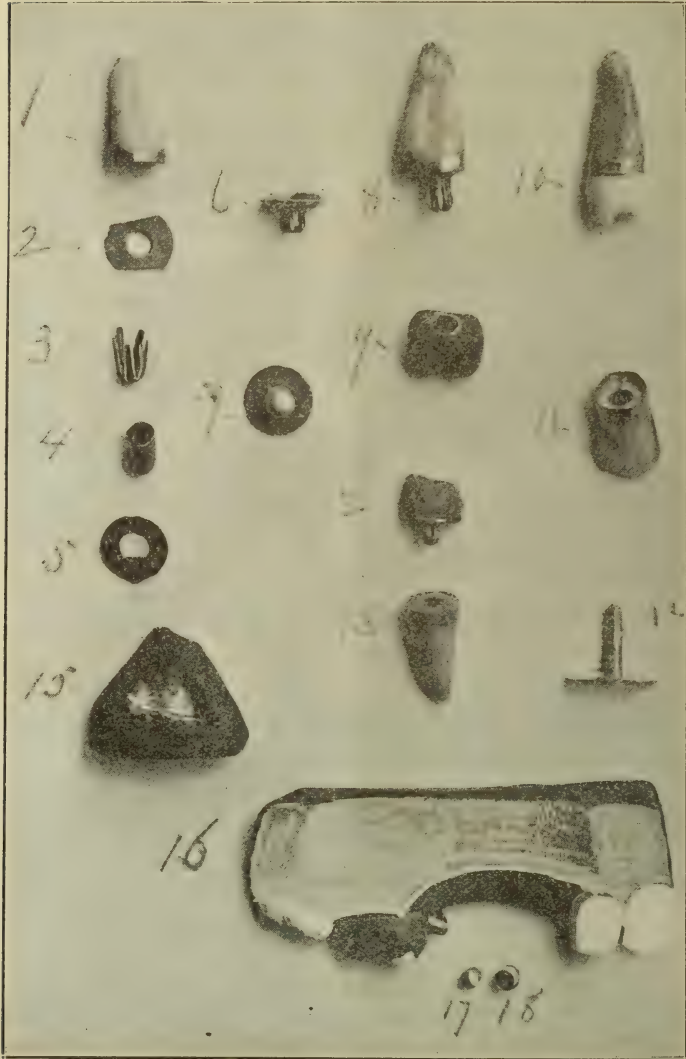
For five years I have been experimenting with appliances and combinations of metals which would hold saddle plates when in place with the necessary degree of strength and immobility, and yet have these appliances easy of removal and with the ability to tighten the fastening should it in use become loosened.

I have at last succeeded by making a crown which is held by a spring stud, and to which a saddle carrying other teeth can be attached.

The appliances are represented by Fig. 1. No. 1 represents a root capped in the usual way, with a band around it and a pin in the root. (These can be made without bands if desired.) No. 2 is a reducing ring. No. 3, the spring stud. No. 4, platinum cap. No. 5, tooth base-plate.

In assembling these parts an impression is taken in plaster of the capped roots (these caps must slip off from the roots easily) and the parts to be supplied with teeth. The inside and pins of the root-caps are covered with a solution of paraffin dissolved in ether,

FIG. 1.

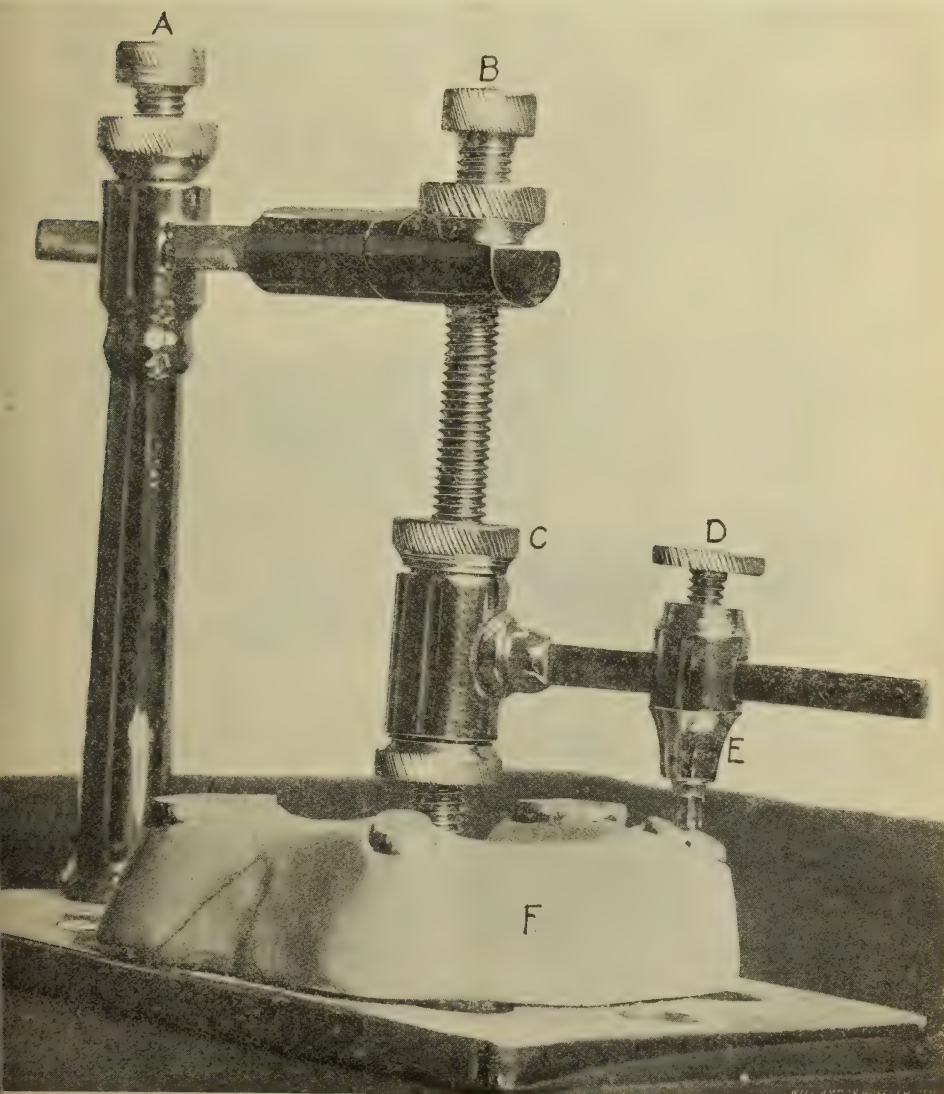


the impression varnished, and a model made. After the model is made it is slightly warmed, so that the root caps can easily be removed and replaced accurately.

This model is waxed on the instrument represented in Fig. 2. This instrument is adjustable in all its parts, and is used to set the

spring studs perfectly parallel one with the other. The cap 4 is placed in its holder E, Fig. 2, and the spring stud slipped inside it; and, if the small size is used, the second size cap fits inside the

FIG. 2.



first, so they can all be telescoped together, and the one holder D, Fig. 2, is used for both sides. They are brought to the position they are intended to occupy on the root cap, as at E, Fig. 2, and the angle observed to which they are to be ground or filed. With the holder D they are removed and cut to the proper angle, both

cap and spring at the same time, taking off and replacing until this result is obtained accurately. Then we take the reducing ring No. 2, Fig. 1; remove the spring stud from the holder, and by a twisting movement insert in the opening, turn it over and solder on the back, as at No. 6, Fig. 1, which shows Nos. 2 and 3 together. This will make the spring stud just as much shorter than the platinum cap as the thickness of No. 2.

Now we replace in holder, carry to position, and wax fast with hard wax. We then remove root cap and Nos. 2 and 3, and invest as at No. 15, Fig. 1, showing the root band exposed on one side, and all parts in position.

As No. 2 projects beyond the cap, it is soldered from the cap side. This is then filed up, so that Nos. 1, 2, and 3 are one piece, as shown in No. 8. It is important that the foregoing be accurately and securely done, as these parts remain permanently on the roots in the mouth. We proceed in the same way with each abutment. This finished, we take No. 4, which has been cut at the same time and same angle as the spring stud 3, and place it over the parts represented in No. 8; then No. 5, and slip over it. As these are all punched to a uniform gauge, they fit each other accurately. Fasten together with wax; remove and solder with pure gold or gold and platinum. We then have the crown plate 5 and cap for spring stud, as at No. 7. From this on the crown can be made in any way desired,—all gold, gold with porcelain face, all porcelain, or porcelain with platinum occluding surface; and governed by the length of tooth, position in the mouth, etc.

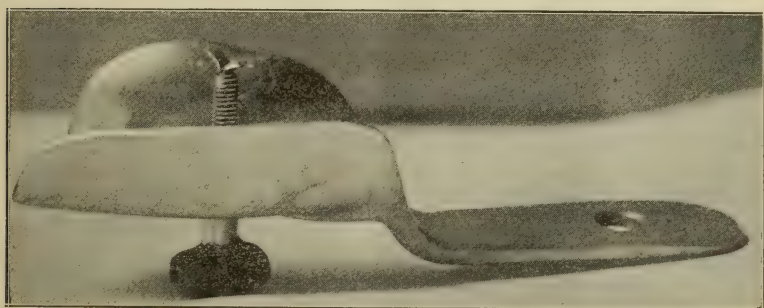
In No. 8 we have 1, 2, and 3 assembled. At No. 9 a porcelain crown, with its base-plate 5 and cap 4 for spring stud inside the crown. At No. 10, all parts assembled. At No. 11 a crown, with supplementary band encircling root cap for greater strength. Nos. 12 and 13 show the parts reversed, the cap 4 in the root and the spring on the base of the crown for very short teeth. No. 14 is a stool made of platinum and iridium, with hollow post fitting cap 4 for holding it while building it up with porcelain and firing. No. 15, a case where the posterior attachment consists of a platinum and iridium solid stud soldered on a gold crown; a sheath of the same metal slipping over it and soldered to the saddle, the anterior end supported by one of my removable crowns.

In making a bridge we replace all the parts represented at 8 in the mouth without cementing to the roots, but they are expected to fit so accurately that friction will hold them with considerable firmness. We then take our previously prepared saddle and put it in position; then take parts, as at No. 7, and slip over the spring stud. As No. 5 is larger than the root, it holds the saddle in place. Now we take our bite or articulation.

An essential feature now comes into play; that is, the taking of the final impression under pressure. To accomplish this I use a prop, which can be made longer or shorter by unscrewing or the reverse, with a cushion of rubber at one end and a yoke at the other. This is placed in a hole in the bottom of the impression cup, working easily up and down, shown in Fig. 3. We use three-minute

plaster, which gives time to adjust in the mouth. Place in position, with the yokes pressing against the saddle and the rubber on occluding teeth; have the patient bite with considerable force; see that all parts are in correct relation to each other, then force up the tray containing the plaster. You thus get an impression, with the saddle forced against the soft tissues, with all the force which will subsequently be used in mastication. Remove the impression, pull out the root cap and spring stud, which will generally come with the impression; lay aside until work is completed; run a model, which will show the saddles and caps in proper place; solder thereon all together; then put on teeth with vulcanite; make continuous gum or solder, as desired. When the bridge is complete cement the root caps carrying the spring, as at No. 8, Fig. 1, to their respective roots. When the cement is thoroughly hardened put the bridge in place. If the retaining spring should ever get loose, it can always be tightened by a very slight tap on the end.

FIG. 3.



In this combination we have the ideal in prosthetic work. Restoration of contour of soft tissues; exaggeration, if necessary, to give a pleasing expression to the face; rigidity when in place; easy removal for cleansing and repair; and, in the hands of skilled men, it would seem to me to make a valuable addition to the armamentarium of the prosthetic dentist.

There being two sizes of these appliances, one telescoping the other, the ingenious operator will combine them to suit the conditions. A case might arise where the tooth to be attached was so small that it would necessitate placing part of the appliance in the root and part in the crown. This can be done by cutting off the end of one of the caps, fastening the spring to the right sized reducing ring, and soldering to the cut-off end of the cap. Then we take an iridio-platinum wire and fit it in the hole, letting it extend down into the spring nearly to its end, and as long as the root-canal will allow, and solder. Then we take the right sized crown cap and solder on the root end, and adapt it to the end of the root. We now take the smaller size cap, carry it over the spring inside the larger cap, and put its crown plate on to correct position, wax, remove, and solder. We thus get an attachment, half in the root and half in the crown. For saving metal I have had hand punches made for punching the different sizes of washers.

BUCCAL AND DENTAL TUBERCULOSIS.

BY DR. S. BERNHEIM, PARIS, FRANCE.

(Read before the International Dental Congress, at Paris, August 8, 1900.)

As the title of this article indicates, the topic here discussed is more of a medical than of a dental character; nevertheless, I hope to be permitted to point out the more essential facts that are related to the practice of dentistry.

Tuberculosis and its bacillus is to-day the subject selected by numerous investigators. Methods of investigation and of early diagnosis have been proposed that are of interest not only to medicine, but also to every practitioner likely to be called upon to treat an organ or a region that may be the seat of Koch's bacillus.

If there is a region that is invaded by a varied bacterial flora where the presence of Koch's bacillus is frequent, it is the bucco-pharyngeal region. The bacilli develop under normal conditions, and in such quantities that a relatively new theory of dental caries has been created,—the parasitic. We consider ourselves incompetent to give an opinion on this question; it will be discussed before you, or it has already been discussed, by men who have made a special study of this question. What we will discuss now is the preference that Koch's bacillus has for the bucco-pharyngeal cavity.

This bacillus is very often found in healthy mouths, especially in those of physicians, dentists, students, nurses, and individuals who come in contact with tuberculous patients. It does not follow that because Koch's bacillus is present in an individual's mouth that he is consumptive, or that he has tuberculous lesions. Strauss found it in the nasal fossæ, in the saliva, and in the bucco-pharyngeal mucous membrane of perfectly healthy persons that had come in contact with tuberculous patients or that had lived in an atmosphere infected with pathogenic matter. It is, then, still more certain that we will find them in the mouths of consumptives. Here very often mucous ulcerations develop. These are secondary ulcerations, consequent to a general infection, and are the local manifestations of a tuberculous infection that has taken its seat in the lungs.

There also, however, very often occurs the so-called buccal tuberculosis, which may be in itself a primary infection. It occurs with greater frequency than the statistics indicate, because the ulterior manifestations of phthisis are more important than the first symptoms; also because the primary lesion is forgotten or cured, and the ulceration of the mouth or of the lips is neglected to be considered the beginning of the infection.

It is useless to insist on the importance of diagnosing buccal tuberculosis in order to prescribe an appropriate treatment and to make a reasonable prognosis. It is a question of double importance. It concerns the practitioner, who is concerned to take prophylactic measures in order to protect himself. It concerns his patient, who has the right to expect from the physician and the dentist the treatment of all the affections of the special region. It concerns all the patients of the same practitioner, who, through the negligence of the practitioner, through faulty antisepsis or

sterilization of his instruments, can become contaminated with the tubercular infection.

At the Congress of the American Society of Laryngology, held in Philadelphia in 1896, Dr. Bryson Delavan, of New York, reported numerous observations of buccal tuberculosis. He reported forty-five of tuberculosis of the tongue, twenty-four of the pharynx, twenty-two of the mouth, eight of the palate, five of the nasal cavity, and four of the tonsils.

Tuberculosis of the different organs of the mouth (and we consider this as the primary tuberculosis) is not a rare thing.

The pathogenesis is like that of every infectious inoculation. Three different conditions are necessary:

First, the bacillus. This is found everywhere, especially in the mouth and nasal fossæ, the roughness of the region and cavities of decay being excellent places for the development of micro-organisms.

Second. It is necessary, in order that the germ should develop, that a morbid and special predisposition should exist. On account of this condition the economy only offers little resistance to the microbic invasion.

Third. The two conditions named would not be of any value if the pathogenic microbe failed to penetrate into the depth of the tissues and enter the blood and lymph currents through some break in the continuity of the tissues,—through an ulceration or through a wound.

As these three conditions are found together very often, it is easy to understand why bucco-pharyngeal tuberculosis is an easy occurrence. Let us examine some of those localizations which are of especial interest to the dentist.

The most frequent is probably *lingual tuberculosis*. Three forms have been described: (1) The tuberculous ulceration, the most frequent kind; (2) the tuberculous gumma, and (3) the lupus lingualis, which are very rare varieties.

Lingual tuberculosis has been admirably described by Trélat, who determined with precision its diagnosis and characteristics. Generally the ulcer is located on the tip or sides of the tongue. The borders of the ulcer are irregular, tortuous, and generally do not adhere to the tongue. The bottom of the ulcer is of a yellowish or grayish color, and has a ravined appearance, as described by Dr. Réclus. The contour presents small, round spots of a pale yellow or of a golden yellow color. These spots are known as the "yellow points of Trélat,"—true tubercles, which are a sign of the lesion and a pathognomonic element of its diagnosis.

Tuberculosis of the *lips* is not of rare occurrence. We do not consider in this group "lupus," which is frequently found. It is a lesion involving the whole face, developing from a small lesion that generally begins at the naso-buccal furrow. In 1897 Dr. Thibierge presented a remarkable case of tuberculosis of the lip to the Société de Dermatologie et Syphilographie of Paris. The patient, a man of thirty years of age, was a victim of pulmonary tuberculosis.

We have had numerous occasions to observe tuberculous ulcera-

tions in the buccal orifice of phthisics. The difference between tuberculous ulcerations and syphilitic ulcerations is that the syphilitic lesions are found at the sides of the buccal orifice, while the tuberculous lesions prefer the antero-medial portion.

The tuberculous manifestations of the *gums* and of the alveolo-dental border are considered very rare, but they are really not so rare, many cases having been reported. One of the most important is the one in connection with the surgical clinic of Bower. The patient, a man of forty-five years of age, had been suffering from ulceration of the alveolar border of the lower jaw. This affection had begun a year before his presentation to the clinic, and had caused the spontaneous exfoliation of several molars and the expulsion of several sequestra. He was also suffering from intense earache, that became more accentuated with mastication, especially at the time of the loss of a tooth. When the patient presented himself to the clinic the alveolar border of the inferior maxilla was deprived of molars on both sides, and was transformed into a groove whose sides were formed by tumefied gums, while the bottom had the appearance of having lost some ulcerative tissue. The explorer could easily reach the denuded jaw. The submaxillary, carotid, and maxillary glands were infected and swollen. The apices of the lungs showed sure signs of initial tuberculosis; the bacilli could be found in the sputa. The treatment consisted in thoroughly curetting the morbid focus, followed by antiseptic gargles. A cure was effected after three months, and after a year the condition of the mouth was good.

The author believes that the tuberculosis of the gums can be primitive, and that such is very often the case.

Tuberculosis of the *maxillary bones* is relatively of frequent occurrence. Drs. Starcke and Czerny have observed and reported eight cases. This variety of tuberculosis begins by a hard and diffuse tumefaction of a portion of the bone. This tumefaction is more or less painful. It is never of an acute character. The contraction of the jaws forms the second sign of the disease. After a certain time abscesses are formed. When these are lanced they give passage to a certain quantity of pus, and often to a sequestrum. The abscess terminates by the formation of a fistula, and this process repeats itself, and frequently without provoking very intense pain. The cervical ganglia become tumefied; the tuberculous infection extends itself, invades the entire maxillary bone and the temporo-maxillary articulation, and from these the bones of the cranium become involved. Maxillary tuberculosis can be of alveolo-dental origin (direct inoculation) or of hematogenic origin; in which latter case it is a secondary localization.

In the majority of cases the patients complain of odontalgia at the level of one of the molar teeth. The cheek is swollen, the breath offensive. If the mouth is examined it is seen that the patient is suffering either from an alveolo-dental periostitis or from an ulcerous stomatitis. The conditions present demand the extraction of the tooth. When this is accomplished the pain persists, and the open alveolus forms a focus of chronic suppuration.

Little by little the tumefaction extends itself over the entire body of the maxilla; abscesses and fistulæ are formed.

Cases of tuberculous ulcerations of the palate and of the velum palati, of tuberculous perforation of the roof of the mouth, the *bucco-pharyngeal tuberculosis*, are found every once in a while, but they belong to the province of the physician rather than to that of the dentist.

We will conclude this communication with the relation of a personal observation: A girl of eighteen years, whose parents had died from phthisis, was brought to my office. This young patient had been treated in one of the Paris hospitals for a suspected dyspeptic affection, accompanied with aphthous ulcerations, which were supposed to be due to gastric disturbances. The patient then went to a dental clinic, where the treatment of the oral disturbances was not successful. When I saw this patient for the first time she was pale, thin, and complained of gastric troubles, and of acute pains provoked through aphthæ on the gums and on the left side of the tongue. There were three lingual lesions, separated from each other by healthy mucous membrane, occupying the dorsal and inferior portion of the organ. They were of oval shape, with irregular borders, surrounded by yellow spots. The bottom of the ulcer was of a pinkish color. The gingival ulcerations were of very irregular form, but the yellow spots could also be found. The teeth were grooved, and in very bad condition. A bacteriological examination revealed the presence of a few bacilli of Koch and numerous streptococci.

The patient was very fatigued and emaciated, and she was sent into the country and submitted to a hygienic *régime* and to proper diet. She also frequently used mouth-washes of sodium salicylate. The result of this excellent cure is that the patient to-day, after eight months' treatment, is without any buccal lesions and in an excellent state of general health.

CONCLUSIONS.

1. Bucco-pharyngeal tuberculosis is more frequent than is generally believed. It can be primary, arising spontaneously in subjects free from general tuberculous infection, and the lesion remains in the state of local tuberculosis. It can be secondary, occurring periodically in the course of pulmonary tuberculosis, especially in the last period.

2. The localizations of this tuberculosis are very variable. They can reach all the organs of the bucco-pharyngeal region,—lips, internal portions of the cheeks, gums, alveolo-dental borders, maxillary bones, tongue, palate, and tonsils.

3. The knowledge of this tuberculosis is indispensable to the dentist in order to take the necessary prophylactic measures for his patients and for himself, and to make the early diagnosis of the nature of the ulcer with a view to appropriate treatment.

4. For in cases of primitive bucco-pharyngeal tuberculosis, when the affection is purely local, a rational treatment, general and local combined, is almost always efficacious. A cure is the rule, depending on the earliness of the diagnosis.

PROCEEDINGS OF SOCIETIES.

THIRD INTERNATIONAL DENTAL CONGRESS, PARIS.

(Continued from page 1317, December, 1900, issue.)

SECOND DAY—THURSDAY, AUGUST 9, 1900—*Continued.*SECTION VI.—DENTAL EDUCATION—*Continued.*

AFTER the reading of Mr. Lloyd Williams's communication (as printed in the DENTAL COSMOS for December, 1900, page 1275 *et seq.*) the following discussion ensued:

Dr. BROPHY. When we make comparisons between the system formerly in vogue and those which are adopted to-day in the various countries, I believe that there is scarcely any room for doubt as to which method will appeal with greatest force to the mind of the average educator.

Dr. Williams has shown by his paper that in America the length of time assigned for this work is not as great as it should be. I think he has also shown that Americans insist that students shall acquire their knowledge of their profession in their dental educational institutions. In England the student becomes an apprentice. He is placed in the laboratory of a dentist, and who will say that the preceptor is qualified to instruct the student as he should be instructed? The schools of England are thus dependent upon outsiders, over whom they have no control, to in part educate their students. In America the institutions do the educational work, and are held responsible for the qualifications of each student. The course in America will soon be extended to four years, but we will always hold ourselves ready to do the teaching, and we will never place any part of our college curriculum in the hands of dentists whose responsibility we do not recognize.

The exhibition of specimens of work by Dr. Williams evidently are from a disreputable school. It seems to me that it would be only fair in him to say that when in America he did see specimens of artificial dentures of the very finest quality and of the most perfect construction.

Mr. LLOYD WILLIAMS. I should like to have heard a larger discussion on what was certainly a short and unimportant paper, but on a subject which, as Dr. Brophy has pointed out, is not only interesting, but also is of very vital importance with regard to the whole matter of the dental education of the student.

I should much like to remove one misconception. If Dr. Brophy will read the paper carefully he will find not the slightest reflection upon any school or upon the quality of the work in any school, either in his country, in my country, or in any other country. The matter referred to was the point of time; nothing else. Dr. Brophy says I have pointed to a disreputable school. It is not a disreputable school; it contains some of the best men whom we honor as members. The only thing I desire to point out—and I trust he will accept it—is that when it comes to a matter of comparison

between the time which is given to this subject in other schools, I do say it is not only perfectly fair but right that I should call attention to the fact that it is possible there are men who have education at heart who think that ten and one-half weeks' instruction, if they devote their whole time to it, is sufficient. Not that there is anything disreputable; not that I have anything to say against the quality of the work done in that school, which may be particularly good. And if it is any comfort to him that I should bear public witness to the quality of the work which I saw in his country, I am pleased to say in public that there is not only much good work being done educationally in America in this subject, but that the quality of the work, in all its departments, is exceptionally good. I had the pleasure of seeing some of the finest work which one could see the world over.

I am pleased to bear testimony to this fact if it is any comfort to him, but that was not part of my paper. I believe that the very minimum of time which should be spent, in his country and in my country, should be two years, the whole time of the student being devoted to it during that period. If it were possible for the time spent to become whittled down first to one year, then to eight or ten months, then to six months, it might be that the student would eventually become crowded with instruction in ten and one-half weeks. We should bear this possibility in mind, and take it back with us. I am sure Dr. Brophy will do so. He is one who is particularly interested in education, and he is connected with one of the finest schools in America. Are we, in our own particular school, in this city, are we in this great country, which is turning out so many students, giving proper attention to our students? Are we giving them that time which they ought to have to train them for the very important work which they have to perform?

The president announced that Dr. A. SIFFRE would read his paper (of which an abstract follows) on

THE RECRUITMENT OF TEACHERS FOR DENTAL SCHOOLS.

Dr. Siffre spoke about the necessity of special training and studies for those who intend to become members of the teaching staff. He said that the question of the education of future professors should be discussed prior to that concerning the students, and concluded his brief remarks by asking that Section VI should present to the General Assembly the following proposition:

"The members of Section VI of the International Dental Congress of Paris, considering the importance for the community that the dental schools should possess a teaching staff intelligently and methodically formed, are of the opinion that every state should create a teaching commission, which should be known under the title of Superior Council of Dental Education. The first duty of this body would be to study the best means of assuring the formation and selection of professors for the dental schools."

Discussion.

Dr. Roy. Dr. Siffre complained of the absence of a pedagogic training for those who desire to become professors in the dental

schools, but I believe that his complaints are not based on very solid facts. His observations refer not only to the dental schools, but also to other institutions of higher educational training, and particularly the School of Medicine, where a pedagogic training for the formation of professors does not exist, nevertheless the professors in that institution are not devoid of teaching abilities. The system of teaching alluded to exists only in the normal schools. Some time ago I attended the Congress of Higher Education and discussed this same question; we talked on the method of selecting teachers for normal schools.

Dr. Roy then said that he wished he could read his own communication treating of this question, and that he would say a few words concerning certain points that are discussed in his own paper. He had examined the methods in different schools, and found that nowhere except in the *Ecole Dentaire* of Paris are the positions in the teaching staff obtained through competitive examinations. Dr. Roy believes this to be the best method of selecting teachers. He then said that teachers should progress successively through the different hierarchical grades. It was impossible to find a doctor of medicine who could occupy a chair in the faculty immediately after graduation. There are, nevertheless, a few exceptions, but even then they do not have the teaching ability that they would if they had gone through the functions of interne, assistant in anatomy, prosector, assistant professor, and professor. Let us take surgery, for instance, and we will see that the assistant in anatomy gives some preparatory lessons to the students; he helps them to dissect, and instructs them in the principles of anatomy. Later on the assistant in anatomy becomes prosector; the prosectors are selected from among the assistants in anatomy. The prosector directs the assistants in anatomy, and teaches not only the students, but also the assistants in anatomy. Later on he becomes either surgeon to the hospitals or assistant professor. In our specialty things follow the same course. The candidate does not become professor at once, but he goes through the positions of demonstrator, chief of clinic, assistant professor, and at last professor; and I believe that all those positions should be filled through competitive examinations. Competitive examinations have also their inconveniences. For instance, the results are sometimes uncertain, and very often mediocre candidates obtain higher results than the better ones; nevertheless I consider that the competitive examination system is the best. It is natural that in the marking of competitive examination essays the degrees and the work of the candidate, with the positions occupied, should be taken into account.

In all the other schools than the exception mentioned (*Ecole Dentaire*) the teachers are elected by the state in the case of state schools; in certain German universities and in the Swiss schools the state nominates the teachers from the list recommended by the teaching staff. These methods of selecting teachers are very unreasonable, and, as said before, it is only through successive competitive examinations that the candidate should become a member of the teaching staff.

Dr. Spaulding will make a proposition in connection with the formation of a Superior Council. I have also dealt with this question in my paper, in which I refer to the organization that exists in America, and which is known as the National Association of Dental Faculties. In 1893, out of forty-six dental schools, thirty were members of the association. This association protects the schools against doubtful institutions, and also makes the teaching to be nearly the same in all the schools. The delegates of the different schools examine and adopt the program which is considered the best.

I propose in my communication (and this proposition will be presented by another member) that, besides the national association, an international committee shall be established. This would serve as a source of information, would assure the union between all the dental schools, and would work for the unification of the dental studies in all countries.

Dr. SIFFRE. I agree with Dr. Roy on certain things, but I do not on others. We must know if we want the independent or the official teaching. In the first case every capable individual should be at liberty to establish a school if he so desires; this is what exists to-day. But if, on the contrary, we understand by independent teaching the monopoly of two or three schools, which will do whatever they please in regard to teaching methods, then I am not a partisan of the independent system.

If the teaching is free, everybody should be at liberty to do whatever he desires. But these schools must offer assurances and advantages to the persons who wish to enter them. You spoke about doubtful schools. Unfortunately, you can also find them in Paris, and it is on this account that I ask that the actual condition of things should be regulated. It is not right that a man who needs to advertise himself in order to attract people to his office so as to realize material results should qualify himself as director of a school, and should have around him a body of professors that we do not know and that we do not want to know. We do not want those individuals to appear before the public who cannot differentiate between the legitimate and the bad methods. It is for this reason I demand that before a man becomes professor in a school his nomination should be controlled by the government and by an appropriate commission. Before becoming a teacher in a school it will be necessary to possess a license, without which it should not be possible to teach dentistry.

I agree with you that the competitive examination system is the best. There are evidently many men who deserve to become professors and that are above all criticism, but besides them we find men members of the teaching staff who are there only for the purpose of filling vacancies.

Dr. Siffre concluded his remarks by emphasizing the necessity of having thoroughly trained professors, and by saying that the state should play a part in their nomination.

The PRESIDENT. This is a question that has different phases, and should be discussed and considered according to the respective countries, the schools being formed upon different bases.

For instance, in Austria we have no private institutions of higher education like those found in the United States, Switzerland, and France. We only have state schools, and in consequence it is the state that nominates the professors. This condition should also prevail in the countries where only private schools exist.

In Vienna, besides the medical faculty, there is a special school,—the Polyclinic. It is an institution of young professors who have the right to teach but not to confer diplomas. Once in a while a professor is nominated from among these teachers. In Austria a professorship in dentistry became a free position. It was thought that the right man could not be found in Austria, and they went to Germany, where they obtained the services of Herr Denicker, who is not a graduate in medicine, a requisite without which it is impossible to practice dentistry in Austria; but his colleagues in Prague considered him as being worthy of the position he occupies.

In Austria, notwithstanding that a degree in medicine is necessary in order to practice dentistry, this is not exactly a reason why a man who has distinguished himself in a particular line of work and who has not the required degree should not teach. The faculty judges from his work, and I think that this is the best criterion. I believe that the schools should be able to select their teachers, even from foreign countries, by publishing the fact that competitive examination will take place on a certain date. In this way the most capable men will be secured. We have many foreigners as teachers. They did not have the right to practice, but as soon as they become professor they acquire the right.

Dr. SIFFRE. I am glad that President Franck partially agrees with my views on this question. I am of the opinion that the selection of teachers should be based on the professional worth of the different men from among whom the selection has to be made.

Dr. Siffre then spoke about the advantages offered to a medical student from the first year of his professional studies. He spoke about the *externat*, the *internat*, and the different positions of assistant in anatomy, prosector, etc., and said that the dental students did not enjoy any of those privileges, and that when they obtain the diploma they never return to take up any special studies. We find certain exceptions in men who of themselves have acquired the special knowledge they possess. He finished his remarks by emphasizing his demand for the creation of "The Superior Council of Dental Education."

Dr. ROY. I spoke a few moments ago about the American Association of Dental Faculties, and I said that it was formed by a number of schools with the purpose of forming a standard educational program. Every school is at liberty to modify this program, to increase it, or to decrease it, but a common minimum is established. These associations are compatible only with the independent *régime*. When the schools are under the state rules these associations are absolutely useless.

Dr. Roy then established a parallelism between the advantages offered to the medical students and the different dental positions of demonstrator, chief of clinic, etc. We must not forget that in our

profession the technique plays a great rôle, and hence it is necessary that the members of the teaching staff should go through these different positions.

Dr. SIFFRE asked where our students could take special courses in bacteriology or say some other branch. I will say that even the medical students, when they take up special studies, may go to any of the free institutions, as, for instance, the Pasteur Institute.

After a long dissertation on the condition of things in Germany and Austria, Dr. Roy said that he thought that the competitive system he alluded to refers rather to the technical than to the theoretical. He added that the formation of the Superior Council of Dental Education was not a necessary thing, for in such a case certain restrictions would be imposed by the state upon the candidates, and one of the first would be that the dentists of the hospitals should possess the degree in medicine.

Dr. SIFFRE said that he had not mentioned state intervention.

The PRESIDENT said that the question had been sufficiently discussed; the views expressed differed, and those who did not take part in the discussion had now an opportunity to form an opinion on the actual condition.

Adjourned at 6 P.M.

SECTION VII.—(a) HISTORY OF DENTAL ART; DENTAL MUSEUMS. (b) LEGISLATION, JURISPRUDENCE, AND DEONTOLOGY.

The Section was called to order at 4.15 P.M. by its president, Dr. Stevenin.

The president then called on Dr. Lemerle to read the communication of Dr. VINCENZO GUERINI, of Naples, entitled "The Historical Development of Dental Art."*

Discussion.

Dr. STEVENIN. Dr. Guerini speaks of Dr. Toulouze, who observed a kind of cement that was used in ancient times for the filling of the teeth. It seems to me that that is not a very convincing proof that teeth were filled in ancient times. I mean with cement and not considering the question of gold. It is regrettable that the composition observed by Dr. Toulouze was not analyzed.

Dr. LEMERLE. Had Dr. Guerini been present I would have asked him a few questions. Dr. Guerini practices in Naples, where he has an interesting and complete museum of his findings in the ruins of Herculaneum. He has very old instruments belonging to dentistry. I have been doing the same kind of work as Dr. Guerini, and I wrote to him to ask if he could give me information or reproductions of instruments. I have not received any answer; if he had been here he certainly could have given us useful information.

The PRESIDENT remarked that Drs. Dowsley and Bryan, who were to read their papers at this meeting, were absent.

He then made the following remarks: It is certain that the

*This paper is printed in full at page 1 of this issue.

object of dentistry is to relieve humanity from suffering. But, besides this, the dentist has another purpose: the one of realizing pecuniary profits. Section VII treats especially the question of the material interests of the dentist, and should not be entirely abandoned.

Adjourned at 5.15 P.M.

SECTION VIII.—HYGIENE AND PUBLIC DENTAL SERVICES.

The Section was called to order by the president, Dr. Martinier.

Mr. CUNNINGHAM said that as his communication was of general interest, he would read it at one of the General Assembly meetings.

The president called on Dr. ERNST JESSEN, of Strassburg, to read a paper (of which an abstract follows) entitled

INSTRUCTION OF THE PUBLIC IN REGARD TO THE VALUE OF DENTAL TREATMENT IN RELATION TO GENERAL HEALTH.

For some time I have been trying to prove through the *Reichs-Medicinalanzeiger* the necessity, in the interest of suffering humanity that physicians should have some knowledge about dentistry, and that they should attend a course of lectures on odontology, just as they do in the case of the other special branches of medicine. At the same time that the physicians are instructed on this important branch of medical science the people should also be enlightened on the hygienic importance of dental treatment, if dental science wants to occupy the important position due to her for the sake of public hygiene. The results of rational dental treatments are manifested in the prophylactic effects which they produce on the health of the entire organism, but this effect can only be reached if the public is instructed on the value of these measures. Every one should know that to have healthy teeth is the first condition essential to keeping the stomach in a healthy state, and in order to derive the greatest benefit from our food, and to preserve or improve our health. In the following lines I shall demonstrate the necessity of enlightening the public on the importance of dental treatment.

Hygiene, which teaches us the manner of preserving the health, rests to-day on a solid basis, and occupies a sure position in scientific and in public life. Its great value for the social development of the people is known by every one. Hygiene by itself forms an important branch of the socialism of the state. It not only does prevent disease through personal sanitary care, but it also tries to improve the health of all the organs of the body. For many years sanitary measures have been growing, and it can be said that the interest in hygiene has increased. We see this in the provisions for water supply, even in the smallest towns; in systems of sewers; in the construction of public baths; in the establishment of disinfecting plants; in the police regulations regarding buildings; in the creation of municipal slaughter-houses; in the control of the public market; in the construction of modern houses; in the perfect heating and lighting plants; in the well-organized private hospitals, isolating the patients attacked with contagious diseases in special buildings;

in the construction of healthy barracks and prisons; in the modern conveniences of workingmen's houses; in the creation of economic kitchens and also schools of cooking and housekeeping. The authorities also try to help public hygiene. They have made vaccination a compulsory measure; they have nominated work inspectors, health advisers, and have created charitable institutions, such as the fund for assisting the poor (*caisses de secours*), and the insurance against death or accidents, etc., so as to remedy the sad consequence of a temporary or permanent incapacity to work. Institutions of this kind have also been founded by private persons. The essayist then said that many manufacturers do more than the law requires, and gave as an example the ideal organization of the town built by Mr. Pullman, of Chicago, for the benefit of his workingmen. He said that the town occupied by the workingmen of the Krupp factory afforded another example of a well-organized hygienic system, and that all these sanitary precautions prove that hygiene is better understood to-day than it was in former years.

He then expressed himself as follows: It is to be hoped that with the aid of the government, municipalities, and charitable private individuals we may be able to organize a satisfactory mode of living. It is unfortunate that the lower classes should be the ones especially concerned in ignoring the importance and value of a good home and of healthy food and clothing. Ignorance, indifference, indolence, and prejudice prevent very often the realization of that which could be obtained with the means at our disposal. Unfortunately, not only the inferior classes, but also the better ones, do not understand the steps to be taken in order to preserve health, and it is necessary that every individual should know the value of hygiene.

In order to increase the general health of the people the earnest participation of every one is indispensable. The particular hygiene of every man has to be developed. The instruction in hygiene has to become popularized, so that practice shall become united to theory and theory to practice. The objects of hygiene are to convince man that disease is very often caused by his own negligence, or by the unhealthy conditions of our system of living, of our homes, and of our work, conditions that can be prevented if the causes are suppressed. These are the duties of public and private hygiene. Rubner tells us clearly that, unfortunately, the lack of fundamental notions of natural and medical sciences is very great, not only among the lower but also among the upper classes. For instance, an educated man would be very severely criticized if he did not interpret correctly a passage of a classic work. Nobody would dare to miss a Latin or Greek exercise, but nobody is ashamed to ignore the constitution and functions of his own body. The children inherit this ignorance from their parents, just as they do any particular disease. It is there that our instruction should begin, in order to make them know that, besides a healthy home and good food, the body requires some rational care and attention.

We may do for the care of public health many things, in regard to the condition of the dwelling, to the place and condition of work, to the clothing, food, system of living, that will improve the general conditions, but a true improvement in the health of the individual and of the people will not be secured until the necessary amount of attention shall have been directed upon the care that the human body requires. It is true that for this purpose the public bath-houses, the economic kitchens, and gymnastic exercises play a great rôle, but a great deal more important is the care that the teeth should be surrounded with, for it is only through good teeth that it is possible to preserve the health of the stomach, to assimilate the food that we take, and to form the basis of the health and happiness of the body.

This opinion becomes generalized in the higher classes, and the increasing and continued success of dental polyclinics proves us that the less wealthy classes attach already great interest to this portion of the human body. The author quoted the opinions of several prominent men, and continued his discussion by saying: The Board of Health of the empire demands, in order to improve the public health, that the dentist shall be visited every six months. This should be practiced principally in Germany, where this habit does not exist, in contradistinction to the United States and England, where it has been in practice for a long time. This recommendation is very reasonable, for the statistics of children from six to fourteen years, and of young men from twenty to twenty-three, gathered in Germany through the recommendation of Röse, show the terrible result of the propagation of dental diseases. In the best localities seventy-eight per cent. of the individuals had diseased teeth, and in the localities where calcium is scarce the proportion is increased to ninety-nine per cent.

Cunningham, who inspected the English and Scotch schools, found that 10,517 children of about twelve years had a total of 35,279 diseased teeth, and only 1508 children (14.2 per cent.) had healthy teeth.

In Strassburg, out of 3000 children of the primary schools, only 165 had all their teeth in good condition, while the rest had a total of 12,917 diseased teeth.

The proportion is the same nearly everywhere.

It is evident, and we can never repeat it too often, that this enormous propagation of caries of the teeth in all classes of the people ruins the health of the individual, and constitutes a great danger for the general health. This danger is caused partly by the teeth themselves, but principally by the great deal of harm that the body suffers as a consequence of the destruction of teeth. A continuous toothache is capable of causing loss of appetite and sleep, and of rendering us incapable of performing our daily duties. The *débris* which accumulates in cavities of decay produces a very disagreeable odor when it undergoes decomposition; the presence of cavities and of roots are the cause of fetor of the breath.

It must be remembered that the mouth is the entrance for morbid substances, and for micro-organisms of all kinds that enter the

mouth from the surrounding atmosphere, where they are found in great quantities. They accumulate upon diseased teeth and in cavities while waiting for an opportunity to penetrate into the interior of the body. It is for this reason that pathogenic microbes of all species are found in healthy individuals; and also in clean mouths they develop very well at the temperature of the mouth, and are only waiting for a *locus minoris resistentiæ* to become active. They find there the most suitable conditions for their development. The saliva, particles of tissues, and food *débris* in decomposition serve them as food. Under normal conditions the organs of the body, especially the gums, possess enough resistance to prevent the micro-organisms from entering. The nose and throat act normally as nearly perfect filters for the retention of bacteria, but very often these develop in the mouth. The exudations of gums inflamed through the presence of tartar, and principally through decayed teeth with cavities filled with food *débris*, also ulcerated gums, are perfect incubators for bacteria. Although it is a very well-known fact that these organisms are the cause of diseases, great negligence is shown in this connection.

Great sums of money are spent in order to go to the country, to the mountains, or to the seashore, in order to breathe an atmosphere that contains less micro-organisms than the one surrounding great cities. Milk is sterilized in order to kill the bacteria that might be present, but in the mouth no precautions are taken where true microbic growths are carried on.

From the mouth these micro-organisms can penetrate the interior of the cranium, into the salivary glands, lungs, and even into the general circulation. Even in the mouth these accumulations of bacteria cause very often inflammations, which can become very serious. Miller says that as much attention should be paid to the mouth in cases of digestive troubles as to the diseased stomach. Want of appetite, bad taste in the mouth, and specially fetor of breath, that are supposed to originate in the stomach, are only caused by a neglected and unclean condition of the mouth. These statements prove us that the masses of bacteria found in unclean mouths independently of those introduced with the food and beverages are sufficient to provoke fermentations and chronic dyspepsia of the stomach.

Bacteria of diphtheria have been discovered in the mouth of a healthy child. The bacteria are only waiting for certain favorable conditions in order to produce their specific effect. Even the agent of pneumonia is found very often in the saliva of healthy people. The infections caused by bacteria from the atmosphere or from contact with infected objects are favored by the unhygienic condition of the mouth. In consequence one of the most important preservative measures during an epidemic consists in giving to the mouth the kind of care required by the particular case.

What I have said about the micro-organisms of the mouth, about the dangers of infection for the entire organism, and about the care of adults' mouths has a greater bearing in children. The child's organism, being very delicate, and in consequence very sensitive to

the least amount of irritation, is exposed to indigestion, the consequences of which are so serious that they may become injurious to the development and prosperity of the child.

The sad consequences which result from the negligence of the deciduous teeth are disorders of the stomach, irregularities of the teeth, abnormal development of the maxillæ, which results in deformities of the face. Also cavities of decay furnish, as we have already said, incubators for microbes, which are the cause of numerous diseases. We should also take into account the suffering of the child from toothache. It is this last condition that everybody recognizes, especially the physician who has to treat a child who is constantly crying and complaining from the results of an aching tooth. If such is the case, it is difficult to say for whom the troubles are greater, whether for the parents, for the child, or for the dentist.

It has been said that, notwithstanding the resistant constitution of the adult, catarrhs of the stomach, against which all therapeutic agency is powerless, are sometimes reported. Römer says that disorders of digestion, with all their consequences, are the greatest and most frequent disorders caused by caries of the teeth, for decayed teeth cannot properly masticate food, and hence the admixture with the saliva does not take place in the right way. It takes more time for the gastric juice to impregnate and digest the ingested food. The food stays in the stomach for a longer time than normally, and very soon abnormal fermentations cause digestive disorders to take place. Besides, the pieces of insufficiently masticated food irritate the mucous membrane of the stomach, producing a chronic inflammation. Many of those chronic catarrhs of the stomach are the consequence of insufficiently masticated food, and, besides the mechanical irritation caused by insufficiently masticated food, there is also irritation caused by the ingestion of decomposed matter from carious cavities and decayed roots. The longer this unhealthy state lasts the more does the stomach suffer. In consequence general nutrition will suffer the consequences of these disorders, and such disturbances as anemia, general weakness, diminished resistance to diseases, and a premature death may follow. Römer advises to visit the dentist at least once a year in order that decayed teeth shall be filled before caries has had the opportunity to reach the pulp and to cause pains and destruction of the tooth. He advises to visit the dentist at least every six months during childhood, before and after the evolution of the second dentition, during the ages of fourteen and fifteen years (puberty), and during pregnancy, when the teeth are predisposed to have salivary calculus deposited upon them.

The writer emphasized the necessity of caring for the deciduous teeth, and pointed out the evils resulting from the destruction of these organs. All these disturbances can be remedied only through regular visits to the dentist. He then mentioned Parreidt's, Klencke's, A. Bramsen's, Cunningham's, Süersen's, and Witzel's popular treatises on the teeth, and said that their works, in combination with proper statistics showing to the parents the disastrous

condition of their children's teeth, have been of some value in this direction. Everything should be done in order to convince the people that the health of the oral cavity is absolutely necessary for the conservation of the general health.

Dr. Jessen praised Dr. Oscar Römer's work, and showed the record cards used in the Dental Polyclinic of the University of Strassburg. Dr. Römer's work has been largely distributed, and it will surely be of great benefit.

Dentistry, the essayist said, should be a factor in popular hygiene. Systematic care of the mouth and teeth should be exercised, and special attention should be paid to the lower class. The dentist should try to convince every patient that his general health depends on the condition of his teeth, and the operator should treat not only the aching teeth, but his aim should be directed toward the total restoration of the health of the mouth.

Dr. Jessen advises physicians to examine the mouths of young patients complaining of headaches to see if decayed teeth or roots are not present, for many cases of nervous disturbance of eyes and ears, neuralgia of the head and face that could not be treated by the oculist, aurist, and other specialists were successfully treated by the dentist, who only treated a tooth or extracted a decayed root which were the cause of suffering that had lasted during years.

The essayist ended his article with a few more remarks and quotations from Rubner and Kirchner.

Discussion.

Dr. FENCHEL discussed Dr. Jessen's paper, and finished his remarks by saying that the dentist should work in order to demonstrate to the state and to the public authorities the utility of improving the health of the people.

Dr. JESSEN said that, according to statistics gathered in Alsace-Lorraine, eighty-six to ninety-five per cent. of the population are suffering from the teeth. He said that the people should be taught to care for their teeth, and that this education should begin in school. We see many children that cannot eat during the daytime and that cannot sleep during the night on account of continuous toothache. It is not possible that those children should become healthy men when this condition lasts all year round and is transmitted from childhood to adult age. A strong nation must be one whose public health is good, and men cannot be healthy if they do not take proper nourishment. He also said that the public authorities should be informed of the disastrous condition of the children's teeth through statistics showing the ravages of decay.

Dr. BONNARD said that he believed that the teachers in the schools should instruct the children about the necessity of taking good care of their teeth; that such a measure is absolutely necessary for the performance of the essential organs, especially of the stomach; in one word, for the general physiology of the individual. But in order that practical results should be derived from these measures we should not depend entirely on the teacher's work. It should not be declared that it is too early to nominate dental inspectors.

There is not a single state that would postpone the nomination of dental inspectors if the utility and importance of these inspections would be known. I regret that Dr. Jessen should have reached such a conclusion. He also said that dental inspections should take place at least once a week. You all know how difficult it is in certain cases to recognize dental caries; those cases when only after using the electric mouth-lamp and after long observation a difference in the color of the enamel can be detected. There is caries in hidden places forming cavities that are not long but deep, and that can be scarcely seen, as, for instance, in caries of bicuspid. Now, if the inspection is made by a teacher he will not be able to recognize the diseased tooth in spite of his good intentions. As soon as the tooth begins to ache the child ceases to masticate with the teeth of that side; tartar will be deposited, and all the evils resulting from this deposition will follow. Dr. Jessen says that tartar is the principal cause of dental disturbances. It is formed wherever food *débris* is found; acid fermentations take place, and we know the effect upon the enamel. This is the first cause of dental caries. The decayed tooth will be the cause of faulty mastication by the side affected, and caries of the molars will be the result.

Dr. Bonnard then argued about the necessity that the inspections should take place at least four times a year, and said: It is not the physician, no matter how capable he may be, that is able to recognize caries of the second degree. If the inspection would take place only once a year the dentist would always be too late, and if he is called to treat the tooth when the caries has reached the fourth degree, how can it be expected to preserve the children's teeth? It is for these reasons that we should attend to this question right away, and that we should ask for the nomination of one dentist for every school. He would examine the children's mouths, and could also give lectures on hygiene.

Dr. Bonnard concluded his remarks by asking that Dr. Jessen's paper be slightly modified, and that a resolution be passed asking for the nomination of specialists, and not of physicians, in order to inspect the schools four times a year.

The PRESIDENT (addressing himself to Dr. Jessen). Will you allow the modification we have reference to?

Dr. JESSEN said that he was not opposed to Dr. Bonnard's opinion, but that he thought that an annual inspection was sufficient, for in cities where we find twelve and fourteen thousand children the number of dentists required would be very great. He also said that in a private practice the patients can be made to come three or four times a year, but he thought that for the public schools an annual inspection was sufficient.

A MEMBER. I will just say a few words in order to express how far behind France is in regard to dental inspections. You remember when our colleagues wanted to create a gratuitous dental service in the Paris schools. I wanted to follow their example. I made a demand to the Conseil Municipal offering to care for the children's teeth. My demand was rejected, and the one that was most strongly opposed to my petition was the asylum physician.

Dr. EVANS. I believe that Dr. Jessen said that the teacher should have certain authority. He should have charge not only of inspecting the children's mouths, but he should also inculcate to his pupils some rudiments of hygiene, and to show them that the mouth has to be cleaned, just as the face, arms, etc.

Dr. BONNARD. Dr. Jessen is of the opinion that a yearly visit is sufficient, and I think that his conclusions are insufficient. A visit should take place every three months. It is only through repeated inspections that we will inculcate in the spirit of the children the principles of hygiene and of defense against dental caries.

Mrs. LIMBERG. Professor Limberg says that there is not an organized service in Russia. It has been planned, but it is not organized as yet.

The PRESIDENT. Before closing the discussion we can say that we desire that inspecting visits should take place at least once every three months. Considering the difficulties that we are encountering, it is not sure that we will be successful everywhere. We must try and ask. On the other hand, we should not be satisfied with a yearly visit, because of the many difficulties. We should work for the good of humanity, and we should do everything in order to secure the organization of a dental service.

A MEMBER. We have the work of Professor Jessen. The only thing we would have to do would be to reprint the fasciculus and to send it, accompanied with our demand, to the authorities.

Dr. FENCHEL, of Hamburg, then read a paper (of which a *résumé* follows) entitled

THE GUSTAVE MELLIN ENDOWMENT AT HAMBURG: ITS PURPOSE AND MODE OF ACTION.

The Gustave Mellin institution in Hamburg is a dental hospital created by its founder and provided with an endowment of 500,000 marks. The purposes of the institution are: First, to give dental treatment to the poor of Hamburg; second, to treat the teeth of poor school children according to a determined plan; third, to work for the advancement of odontology by means of scientific researches.

In order to obtain these results the teeth of one thousand children are treated yearly, one thousand artificial teeth are gratuitously inserted in poor people's mouths, and the hospital is open every weekday from nine o'clock until six for the treatment of diseases of the teeth. There are four rooms containing eight operating chairs, a mechanical laboratory with room for nine men; a very good library and a scientific laboratory offer good opportunities for scientific research. A laboratory and an office for the director complete the installation.

The authorities of the institution wish to treat six thousand children in the first year; the second year a thousand new children, and to examine the mouths of the children treated the preceding year. The hardest task would come at the end of the second year, when a thousand children would have to be treated and six thousand examined. As the number of poor children in Hamburg amounts

to fifty thousand, the Mellin Institution, notwithstanding its large resources, is not in a condition to treat all the poor people of Hamburg. It is for this reason that Dr. Fenchel believes that the government should contribute to this work, for private charity will not be sufficient to arrest dental caries.

The author exhibited the installation of the Mellin Institution by means of a series of lantern-slide illustrations.

Discussion.

The PRESIDENT thanked Dr. Fenchel for his communication.

Dr. STEVENIN. I would like to ask a few questions. Dr. Fenchel has told us that Mr. Mellin was an Englishman?

Dr. FENCHEL. Yes, sir.

Dr. STEVENIN. What was the cause that determined Mr. Mellin to spend such considerable sums in creating this asylum? I would also like to ask if he (Dr. Fenchel) has not a private practice besides being at the head of the institution in question?

Dr. Fenchel has told us that 500,000 marks were spent in acquiring and fitting up the institution, hence all the capital has been spent, and its income amounts to only 4000 marks. I would like to know what are the expenses and the amount secured from the operations performed.

Dr. FENCHEL. I thought I had already said it. We have to treat one thousand children a year. The expenses amount to 2500 marks per year. One thousand artificial teeth are also supplied.

The PRESIDENT. The 500,000 marks have been totally spent?

Dr. FENCHEL. Yes; entirely. Mr. Mellin has also said that it was not his intention to continue his donations of 40,000 marks a year, as he had done during the three first years.

The PRESIDENT. Is it 40,000 marks in three years?

Dr. FENCHEL. No, for every year; 120,000 marks altogether.

The president then called on Dr. TH. FRICK, of Zurich, to read a paper (of which an abstract follows) entitled

THE FEEDING OF THE NEWBORN IN RELATION TO DENTAL CARIES.

The direct causes which favor the production of dental caries are generally known. It has been clearly demonstrated that caries is the result of a process partly chemical and partly biological, provoked by the micro-organisms of the mouth and by the decomposition of food *débris*. This results in the disorganization of the teeth. But, as there are people whose mouths contain the micro-organisms combined to the food *débris* and nevertheless do not suffer from caries, we are obliged to admit that besides the immediate causes there are other factors which are necessary in order to produce dental caries.

We will indicate those factors which constitute a predisposition to dental caries.

The frequency of dental caries has increased considerably since fifty years ago, particularly in certain localities.

As it has not been demonstrated that the immediate causes of dental caries are more active, and as it is probable that they are not,

judging from the way in which the hygiene of the mouth is observed, we must conclude that it is the predisposition to dental caries that is more frequent.

I have practiced for ten years in a locality where dental caries is very much disseminated, and naturally I have been working to discover the cause of such an exceptional predisposition. I think that it lies in the fact that the children of this region, instead of being nourished by the mother's milk, are artificially nourished, during the first year especially, with sterilized cow's milk.

The feeding of the infant with artificial preparations or animal milk is incomplete, and brings about a certain amount of degeneracy. This degeneracy affects the entire organism, especially the mouth and teeth. It causes a modification in the shape of the teeth, which permits of the easy deposition of food *débris*; also a diminution of calcareous salts, and probably by the fact that the saliva loses its property of destroying micro-organisms. It is due to these different changes that the predisposition to caries becomes stronger, and takes place with more frequency.

These are undoubtedly hypotheses, assertions that have to be demonstrated. Certain experiments performed with domestic animals tend to prove them. Every farmer knows that if horses, calves, or dogs are deprived too soon of the mother's milk, or are nourished artificially, they develop poorly or die. The following experiment is also a convincing one: Out of a group of six dogs, three were nourished by the mother and three with cow's milk and bouillon. Out of the artificially nourished dogs one died very soon, and the two others had very poorly developed teeth, resembling the rhachitic teeth of man.

Statistics are the only means of demonstrating what I have advanced, and it is the result of statistics that I am going to communicate to you. My statistics comprise more than two hundred cases of my *clientèle*, and the observations extend during several years. Some of the patients are Swiss, many Germans, also French and English. More than one-half had been artificially nourished. I selected exclusively patients under twenty-five years, because in older people the influence of the more advanced periods of life play a very important *rôle*. I have only considered the cases where the teeth are good or decidedly bad, because with the medium cases it is not possible to give conclusions for statistical purposes.

In order to establish the statistics we considered the age of the patient, the feeding process during the first year, the general health, and the quality of the teeth. The mother's milk and the nurse's milk are considered equivalent. We have also indicated how long the infant has thus been nourished. An infant that has been nourished by the mother only during four weeks is considered as having been artificially nourished.

The general health is considered as good, medium, or bad. This appreciation is not based on an exact medical examination, but is made from an approximate observation.

The tabulation showed that degeneracy affects the teeth in par-

ticular, or at least that these organs present the most marked effects, for in cases where the general health was reported as good the teeth were reported as being of bad quality.

The quality of the teeth in which caries is frequent is indicated by numbers ranging from 1 to 5. No. 1 indicates the best quality of teeth; No. 5 the worst.

We give No. 1 not only to perfectly healthy jaws, a thing which is found very seldom in this locality, but also to the dentitions which present but little caries. No. 5 is given to patients under five years with deciduous teeth greatly attacked by caries.

We added the numbers which marked the quality of the teeth, and divided the total sum by the number of observed cases, and we obtained the number 2.87 as the indicator of the average quality of the teeth of our patients.

We then separated those that had been nourished by the mother from those that had been artificially nourished, and we obtained for the previous group 1.58, and 4.16 for the latter.

These very extraordinary numbers clearly demonstrate the opinion that the children that have been nourished by the mother, those that have enjoyed the natural food, have, as a general rule, better teeth than those that have been artificially nourished.

If we separate the children under ten years the difference is greatly increased.

Out of twelve children that were nourished by the mother only one had some of the deciduous teeth and the first permanent molars decayed. Out of twenty-one children artificially nourished, nineteen had decayed deciduous teeth and permanent first molars.

If we consider the numbers indicating the teeth of children that have been nourished by the mother during three and six months, we find that their average is better than those of children that were submitted exclusively to artificial feeding.

We can deduce that the quality of the teeth is improved in direct relation to the period of time that the infant enjoys natural nourishment.

Conclusions.—Statistics tend to show that the artificial feeding of infants is the cause of a degeneracy which is manifested principally by a predisposition to dental caries. It is the duty of the dentist to make extended statistics in order to confirm the exactness of this assertion. Once that this assertion is established they will enlighten the public and advise the mothers to abandon the artificial methods of feeding.

Discussion.

Dr. GUILLERMIN said that Dr. Frick's paper was an exceedingly interesting one, but that he did not partake of his pessimistic opinions. The question of nourishing the newborn is very important. Dr. Bouchard, in his work on "General Pathology," remarks the difference between the natural elements of different milks, as, for instance, cow's milk contains more mineral salts than woman's milk, but is not assimilable. The infants have to be nourished by the mother, and the natural process cannot be replaced by the

artificial one, for if such is the case it is probable that assimilation will be insufficient.

Dr. GUILLERMIN ended his remarks by saying that although he does not approve the pessimism of Dr. FRICK, he does approve his conclusion regarding the necessity for the infants of being nourished by the mother.

Dr. FENCHEL. I think that where a mother does not nourish her child it is on account of certain reasons; that the idea of improving the child's teeth is not a sufficient factor to make her change her mind. In regard to this question I have very pessimistic opinions. We can try, but I believe that we will not succeed.

Dr. VIAU. I saw my friend Dr. FRICK about six months ago. He spoke to me at that time of this question, one that I had never thought of before. Since that time I have observed with more care the children of my *clientèle*. I have been surprised with the exactness of his assertions. I observed facts similar to those mentioned by Dr. FRICK.

Dr. POINSOT. This question on the nutrition of the infant has always interested me very highly, and while at the Ecole Dentaire I always questioned the mother if the child was nourished by her or through artificial means. A very well-known physician used to say that when the mother, on account of a serious reason, could not feed her infant, she could be substituted by another woman, whose constitution should be of a character similar to that of the mother.

Dr. POINSOT said if the milk is too rich in nutritious elements evil results may follow, and mentioned the example of a child that had been nourished with heifer's milk. The child looked very healthy, and everybody was convinced of the nutritious properties of this milk. Everything went on all right until one day the child was taken ill, and died after a very short illness; it was nearly a sudden death. A post-mortem examination was performed, and a coagulated mass was found in the stomach. This coagulated mass was composed of non-digested products, the result of the abundant quantity of nutritional elements found in the milk. Dr. POINSOT then spoke about the importance of lactation, and of the length of the period of lactation. He then said that the changes in the teeth and the disturbances in the general health originate in lactation, also in the length of the period of lactation.

The period of lactation among ourselves to-day is a great deal shorter than among the Arabs. The Arabian women nourish their children for three or four years. Syphilis and tuberculosis are very much disseminated among the Arabs, and nevertheless they have well-developed jaws and teeth. It may be that this tendency to healthy jaws and teeth is an hereditary one. Later on we will see if we can deduce the correct conclusion.

Dr. BONNARD. The artificial feeding of the infant at the expense of the natural process provokes not only poor teeth and disturbances of nutrition, but also a delay in the eruption of the teeth. Statistics show us the striking differences. We can say that these delays in the eruption of the teeth caused by artificial feeding methods are the cause of malpositions and also of the production of abnormally

large interdental spaces. Wherever large spaces are found between the central incisors and these teeth are large, it can be said that the patient has been artificially nourished. The teeth generally develop in an abnormal way.

A MEMBER. We must institute hygienic measures in order to suppress the conditions mentioned by Dr. Frick. It is certain that nutrition and some other conditions have marked effects on dental caries. It is not possible that a child should have good teeth if his general health or that of his parents is not satisfactory.

I wish to call your attention to a work that has been written by Dr. Roumet, professor of physiology in the University of Basel. This book treats about this question, and he has made very good analyses of all the kinds of milk of mammalia. He found that there was a great difference between the different kinds of milk, and that it was not possible to substitute the milk of one mammalian for that of another, because a condition of degeneracy would follow such a change.

In this work he treats of the incapacity of women to nourish their infants. He has questioned women from nearly all the countries in the world in order to find out the exact cause of this incapacity, and also if the degeneracy of the human race is due in any way to the artificial feeding of infants. He found that the principal causes which prevent the mother from nourishing the infant are tuberculosis, nervous diseases, and alcoholism. By this he means that if tuberculosis, nervous diseases, and alcoholism are in the family the mother will not be able to nourish her infant, and if the mother is incapable of nourishing her infant probably the daughter will be in the same condition.

He also studied the question of the influence of syphilis. He found that this disease was not a factor concerned in the capacity for nourishing infants.

There are certain tribes in the Orient where alcoholism is not known, for they never drink alcoholic beverages; but syphilis is very much disseminated. Nevertheless, they never recur to artificial feeding, and if a woman cannot nourish her infant on account of a malformation of the breasts she is substituted by another woman. This is why Arabian men and women are generally well developed.

If you compare the *rôle* of the three factors,—nervous troubles, tuberculosis, and alcoholism,—we will see that the last is the most important. It is very rare that an alcoholic woman can nourish her infant.

From the most recent statistics, thirty per cent. of the cases of tuberculosis are in some relation with alcoholism, and thirty to sixty per cent. of nervous troubles are due to alcoholism. Hence you can see the important *rôle* that alcoholism plays in the degeneracy of races.

DR. FRICK. I wish to say a few words in order to answer Dr. Fenchel, who said that when the mother does not nourish the infant it is because of so serious reasons that is of no use to call her attention to the infant's teeth. That is not exact. I know

many physicians that tell the young mothers that sterilized cow's milk is as nutritious as the mother's milk. I reproach the physicians for so doing, and it is for this reason that we have to call their attention to the relation between artificial feeding and unhealthy teeth. I am convinced that artificial nutrition is the cause of general degeneracy, and that in the teeth the effects of this degeneracy are more marked than in any other part of the body, and hence it is our absolute duty to enlighten the public.

Adjourned.

THIRD DAY—FRIDAY, AUGUST 10.

GENERAL ASSEMBLY.

The General Assembly was called to order at 4.30 P.M. by President Godon.

The president then called on Dr. Roy to read his paper (of which an abstract follows) entitled

DENTAL EDUCATION IN DIFFERENT COUNTRIES.

Dr. Roy's paper was an elaborate *exposé* of dental education, his work being divided into two parts. In Part I the author makes an historical relation of dental education, and speaks of the general organization of schools in different countries and of the dental legislation of Spain, Belgium, Norway, Holland, Austria, Italy, the United States, England, France, Germany, Switzerland, Sweden, Russia, and Japan. He then discusses the methods of recruiting teachers for dental schools, and praises the competitive plan of the Ecole Dentaire de Paris. As to the requirements for admission, the essayist says that, with the exception of England, the conditions of admission are nearly the same in all the countries named. In England before a student is allowed to matriculate in a dental school he must show evidence of having had some training in mechanical dentistry. The duration of dental studies varies from two and one-half years in Russia to four in England. He then gives a thorough description of the theoretical teaching of the different branches taught in the different schools, of the teaching of operative dentistry, extractions, administration of anesthesia, oral surgery, and of the various examination methods.

In Part II he treats of the organization of dental schools, and says that schools are administered by the state, professional associations, or by private persons that may or may not be dentists.

The following are the conclusions drawn by Dr. Roy from his very interesting article:

1. *The best method of organization* of dental schools is the school founded and managed by a professional association. Such a body offers the best guarantee of honorable dealings, progressive ideas, and perfection of teaching.

It is desirable that national associations of dental schools should be created in all countries, and that frequent communication between these associations should be kept up.

2. *The Teaching Staff.*—In the dental schools the members of the teaching staff should be chosen through competitive examination,

taking into account the previous work and degrees of the candidate. It is advantageous, in order to obtain candidates for every position, to oblige them to go through the different positions of the hierarchy of the specialty they have chosen.

3. *Conditions of Admission.*—As regards general education, the conditions of admission in the various countries are sufficient, but from the professional standpoint there is room for the addition of an apprenticeship of a few years, as prescribed by the English regulations. This apprenticeship itself would be improved if it were replaced by an equal length of time passed in a professional school of dental mechanics.

4. *Duration and General Regulation of Studies.*—On account of the extension of studies and of the necessity of preserving sufficient time for technical dental works, the duration of studies should be extended to four, or, better, to five, years. The whole course of study should be given in the dental schools, and the program could be as follows:

First and second years—Apprenticeship to mechanical dentistry; physics, chemistry, and metallurgy.

Third year—Apprenticeship to mechanical dentistry; general anatomy and physiology; preparatory courses of operative dentistry; dissections.

Fourth year—Operative dentistry and clinical prosthesis; dental anatomy and physiology; general and special pathology and therapeutics.

Fifth year—Operative dentistry and clinical prosthesis; special pathology and therapeutics; diseases of the mouth and oral surgery; anesthesia.

5. *Theoretical Teaching.*—The theoretical, but not special, courses, such as chemistry, anatomy, general pathology, etc., ought to be given in the dental schools, where they would receive an attention proportionate to the needs of dentistry. In a general way, care should be taken that the theoretical teaching should not develop at the expense of the prosthetic branches.

6. *Operative Dentistry.*—The practice of operative dentistry should begin as soon as the student enters the school, immediately after the apprenticeship. Before beginning to practice on the patients the students should follow the preparatory course, accompanied by operations upon extracted teeth and on the phantom. This preparatory training should last at least six months. The practical work of operative dentistry, as well as the practical demonstrations, should follow a determined program, in order to teach the operative difficulties and to make a determined number of operations in every group.

7. *Anesthetics.*—The practice of general and local anesthesia should receive as much attention as possible.

8. *Prosthesis* (see paragraph 3).—Dental prosthesis having been studied previous to admission, the teaching of prosthesis, especially of clinical prosthesis, ought to be given at the dental school.

9. *Annual Examination.*—It is useful to have the students undergo an examination at the end of the year, whether school or state examinations.

All practical work should be controlled very strictly by the notes of the student, and if his average is high enough the examination may be dispensed with.

10. *State Examination*.—(A) The state system of examination which is practiced in the United States can be regarded as being better than that of other countries, inasmuch as it leaves to the members of the profession, nominated by the associations, to decide who shall be admitted to practice dentistry.

(B) In consequence, if they are unable to suppress completely the non-professionals from the dental examining boards, the schools should at least try to restrict the number of them to the advantage of the professionals, who ought to be in a majority on the jury.

(C) The state examination should take place at the end of each year of study, and should deal with matters studied during the year. At the same time the system of examining the candidates on all the subjects of the entire course may have its advantages, provided that serious examinations take place at the end of each year.

(D) Because of the impossibility of judging the candidate's technical ability from a short examination session, the examiners should take into account not only the examination work, but also his record of the year's work.

Discussion.

The PRESIDENT said that Dr. Roy had done a considerable amount of work, and that the discussion could, if necessary, be continued in Section VI.

Dr. MARTINIER said that Dr. Roy's conclusions were the result of a study of the programs of all the foreign dental schools, and all those that will read his article will be convinced of his absolute impartiality.

I wish to congratulate him on his conclusions. With regard to technical training, it is evident that in France it has been overlooked, on account of the necessary medical studies required by the Faculty of Medicine. This does not allow us to pay the necessary attention to our technical program. I think that two years for the study of mechanical dentistry and science is sufficient preparation. The duration of the course has to be increased, and if we increase the duration of the course it must be for the study of the technical branches in order to graduate true practitioners. Our difficulties are daily increased with the progress of technic. It is for this reason that more time should be employed in the study of these particular branches.

The PRESIDENT. I agree with Dr. Roy in nearly everything. We do disagree in some details that I will point out in the discussion in Section VI, when I shall read my communication. I will offer some changes in the arrangement and distribution of the working hours. I would also like to remind the persons that make a study of this question that they should work it out not from a national, but from an international standpoint.

I also think that certain errors have been made in the formation of the roster.

Dr. Roy. I will answer this last remark made by the president. Undoubtedly my numbers are not exact. I spoke of 4718 hours of study in a school. Even if the number of hours is 4800, that would not change my plan very much. I did not try especially to determine the number of working hours, but the proportion of time employed for the different branches. At Geneva, for instance, the technical teaching only occupies two-fifths of the total time, while at the Ecole Dentaire of Paris it occupies three-quarters of the total working hours. These proportions that I have figured out on entirely impartial bases are correct. With regard to the number of hours, I will admit that they are not absolutely correct.

With regard to the study of dental education, I will say that I look upon the question from an international standpoint, in order to establish better bases for the teaching of dentistry in every country, so that every school should be in a position to apply these principles according to their particular regulations.

The PRESIDENT. I published for the Congress of 1889 a similar table. Allow me to thank again our friend Dr. Roy for his very important and complete report on the question of dental education. Reports of this kind have to be carefully read before undertaking to discuss them. The more we advance in the work of the Congress the more I see the impossibility of discussing the papers in a complete manner. We have been reproached for not allowing the discussions to continue for an undetermined time, but we have to work in a great hurry, and courtesy has directed us to have all the foreign members read the papers that they have brought to us from so far away. It is better for them and for us that they should not be discussed in detail, for the reflections may be hasty and not reasoned out. It is better that they should know that their articles will be studied during the year. I beg the members not to be severe in their criticism in case I should have to stop a too lengthy discussion. It is our program that obliges us to act in this way.

Dr. MICHAELS, Paris, then read his paper (of which an abstract follows), entitled

RESTORATIVE PROSTHESIS.

The subject relates to the application of prosthesis to surgery for the purpose of repairing the skeleton, and includes the results of restorative operations of this character performed by Dr. Pean and the author.

Drs. Michaels and Pean were stimulated to this work in the hope that by means of prosthesis they would be able to preserve an arm or leg in certain cases where otherwise amputation would be necessary.

The problem of the tolerance of the organism for foreign bodies intended as temporary substitutes for the organized tissues seems to have been largely solved by the results obtained and already reported in the communication made by Dr. Pean to the Academy of Medicine at Paris. It seems therefore determined that foreign bodies are tolerated by the tissues in certain cases where the conditions of success are known. As bearing on the history of the subject, allusions were made to the demonstrations by Professor

Ollier in autopsies of patients for whom operations for resection had been performed, in which the regeneration of osseous tissue following the resection operations had undoubtedly occurred.

Dr. Michaels's study of the subject and the discussion of it with Dr. Pean had led to a firm belief in the osteogenetic properties of the periosteum, and he had reached the determination to make more extensive attempts than had previously been made for the reproduction of lost osseous tissue, with the result that very extensive portions of the skeleton had been successfully restored by the means under consideration. Both the author and Dr. Pean followed the opinion of Professor Ollier as to the necessity of preserving the periosteum, in all operations upon bony tissue taking special precautions with a view of preserving the periosteal membrane. He had conceived the idea that it would be possible if the periosteum is preserved to use prosthetic appliances to favor the reconstruction of epiphyses and even of articular extremities of bones which had undergone resection, and acting upon the idea had prepared, previous to the operation, appliances of vulcanite to replace all or part of individual bones and even of the articulations of the skeleton.

The prosthetic piece must be a reproduction of the bone or of the fragment of bone that it will replace. It must be exactly the same in all dimensions. The adaptation of the piece to the tissues must be perfect. It must firmly but not too tightly grasp the bone with which it will form a single body until new bone is generated. The supporting part of the appliance should be filiform and the attachments should never be by means of plates, because every bone surface covered by a plate is deprived through this fact from contact with the periosteum and tends to become necrosed. The surface covered by wire is indifferent, which is not the case when the appliance is supported by bands, and the larger the bands the greater the area exposed to necrosis. The prosthetic appliance is intended only as an auxiliary to direct the development of new bone through the agency of the periosteal membrane.

We have, too, arranged for the possibility of removing the prosthetic piece at the time when the new bone is found to be strong enough to allow it, and for this purpose the prosthetic piece should not be entirely covered by the periosteum; that is to say, one side of the appliance should not be covered by periosteum, so that not being enveloped by the new bone the appliance will allow of a free degeneration of tissue, its removal thus becoming possible. This will explain the semilunar form of the new bone and the absence of a medullary canal as shown in the radiograph submitted.

We were unsuccessful in a case of subcondyloid osteomyelitis of the femur extending to and including the inferior half of the diaphysis, as related by Dr. Pean in his communication to the Academy of Medicine, March, 1897. The bony tissue had been so entirely destroyed by the suppurative process that a spontaneous fracture took place, and the fragments went through the

muscles and skin. Instead of amputating it was decided to treat this case prosthetically. The lower half of the femur was resected by Dr. Pean, and I replaced it by a prosthetic piece of vulcanite, fixing it above to the remaining portion of the femur and below to the extremity of the tibia by means of an articulation of my own devising which allows the member to carry out its functional movements. Unfortunately, the conditions Dr. Pean expected would take place did not occur, and about three years after the operation the patient could not move his leg and later on had it amputated. After the operation an examination of the structures showed that a long band of tissue resembling cartilage had been formed and in time it would probably have become ossified.

Another case of osteomyelitis, in a male patient, produced by infection from a punctured wound from a rusty nail which the patient ran into his foot, was restored by surgical removal of necrosed bones of the foot and replacing the lost tissue with a cement or paste made of calcined bone. The patient made an uninterrupted recovery with complete re-formation of certain of the small bones of the foot, and the tissues showed entire tolerance of the foreign body in the shape of the cement which had been introduced for prosthetic purposes.

Another case reported was that of a patient who had been suffering from a painful subacute osteomyelitis of the entire upper portion of the tibia. Dr. Pean removed the fungosities from the medullary cavity of the tibia, after which it was filled with bands of decalcified bone. The wound healed by first intention, since which time the patient has suffered no pain, and recovery was rapid and perfect. To-day the patient walks as well as though he had never suffered from any accident, and the radiograph shows a straight and normal tibia resembling in every respect its fellow of the other side.

Another case, that of a man thirty years of age, with tuberculous heredity, entered the hospital in May, 1891, suffering from a difficult abscess in the anterior and superior third of the arm. In June an incision was made, causing the evacuation of pus and a fistula was established. The movements of the shoulder were extremely limited. In February, 1893, a fistulous tract upon the humerus was formed. The shoulder articulation was globular and thick, and movement became impossible. On March 11 an incision which divided the soft parts was made, the pus was evacuated and the scapulo-humeral joint disarticulated, the upper third of the humerus resected, and an effort made to retain as much of the periosteum as possible. After the wound was cleansed, I inserted my appliance, which was a true reproduction of the resected portion of the humerus. On the 20th of July, 1895, two years and a half after the operation, the patient returned to the hospital on account of a persistent fistula at the level of the wound. A probing of the fistula led to the discovery that the appliance was moving. The skin was divided at the level of the fistula in order to reach the appliance. The metallic wires which fixed the piece

to the humerus were cut. The rest of the piece was removed, much force being necessary to accomplish that end. The fleshy exuberant growths were curetted, and under these a new bony formation of semilunar form was found. Since then the patient has been able to use his arm to advantage. The arm is of the same length as before. The shoulder joint can execute nearly all the movements and the patient uses his right arm as he does his left, and performs very hard manual labor without becoming tired.

There can be no doubt that the intervention of the dental surgeon in surgical prosthesis is necessary. The necessity for the use of prosthetic appliances in certain surgical restorations has become evident, and the general surgeon would find this class of work an impossibility without the aid of a trained assistant. This assistant must possess anatomical knowledge and must be a very skillful mechanic, for any fault in the construction of the piece, especially in the arrangement of the attachments, may endanger the result of the operation. The prosthetic piece must approach as nearly as possible the conformation of the bone it will replace, and in order to make it so anatomical knowledge is required. The placing of the appliance is a very delicate operation, and no matter how skillful a surgeon may be, I think he could not place a prosthetic piece that he had conceived himself, or unless he had experimented upon a skeleton as to the manner of placing it. The operation in question requires the conjoint work of two minds that they may assist each other with their anatomical knowledge. They must have unlimited confidence in each other, and it is upon this united work that the success of the operation depends. The dentist and the orthopedic instrument-maker are the only ones to be considered in this relation of assistant to the general surgeon. The latter does not possess the anatomical nor the physiological knowledge necessary for the execution of a piece of work of this nature, and probably he would not have the manual skill which is essential in these operations. It is a class of work which should be intrusted to the dentist, to whose province it really belongs,—I mean the dental surgeon who possesses the anatomical, physiological, and mechanical knowledge that is indispensable.

Discussion.

Dr. MARTINIER. I have worked on the extradental prosthesis that Dr. Michaels has just spoken about, and we have been very happy to see the results obtained by Dr. Michaels. We know that this line of work does not prevent Dr. Michaels from being a scientific man; you all heard his important communication on an entirely different subject. I am glad to congratulate him on having given the opportunity to all our colleagues of examining his patients, for this is always the most important factor of all communications. As a support to his theories he has presented his patients, and we have been able to see that those appliances have been tolerated, especially in regard to the arm appliance,—we have a patient who, after six to seven years, uses his arm in a perfect

way, and performs all the movements except the elevating one. We see that he is in perfect condition when compared with the condition in which he was when first seen by Dr. Michaels.

I wish to point out how interesting this communication is, and to express to Dr. Michaels my admiration for the wonderful appliances that he has shown us on several occasions, in support of which he has demonstrated the results in the patients themselves.

The PRESIDENT. I wish to join my congratulations to the very authoritative ones of my confrère Martinier, who, as a professor of prosthesis can appreciate better than anybody else the importance of Dr. Michaels's work.

Adjourned at 4 P.M.

SECTION I.—ANATOMY, PHYSIOLOGY, AND HISTOLOGY.

The president having called the Section to order, Dr. A. Gysi, Zurich, read his article (of which the following is an abstract) entitled

AN EXPLANATION OF THE SENSITIVITY OF DENTIN.

Nervous fibrillæ have as yet not been found in the dentin. There are authors that thought that they had found them, but it is very uncertain, for the contents of the dentinal canaliculi are not of the same reaction as nerves.

I think that I have found a theory to explain the sensitivity of dentin in the absence of nerves.

Probably you know the physical phenomenon of the incompressibility of water or of substances rich in water. If pressure is applied against one end of a tube which is filled with water the pressure is directly transmitted to the other end, because water is not compressible.

In dentin the same phenomenon is observed. As you know, dentin is traversed by a great number of canaliculi, which are filled with a substance or protoplasm which serves for the nutrition of dentin, and which is very rich in water (about eighty per cent), and which behaves like pure water and is nearly incompressible. When pressure is exercised in a carious cavity with an instrument the pressure is directly transmitted through the semi-liquid contents to the odontoblasts, which are the center of the true sensitiveness of the dentin.

If the dentin contained nerves, it ought to be possible to anesthetize it with cocain or any other anesthetic, which is not the case. Successful results are obtained only when the action of the cocain lasts long enough to penetrate through the thickness of the dentin and to come in contact with the odontoblasts. But if the contents of the canaliculi are coagulated the insensitivity of the dentin is obtained, because once that the contents are no longer liquid they are not so mobile, and do not transmit so easily the external pressure through the dentin to the odontoblasts.

I have with me a series of microscopical preparations to prove what I have advanced, but, as we have no microscope, you will only see the drawings that I have made of those preparations. On every

drawing you will find the explanation in German, in French, and in English. I will pass them around.

Discussion.

The PRESIDENT. This communication is of much interest to the members of the Congress. I ask you to notice the care that has been used in making these drawings and in the descriptions, in order to show with distinctness the interesting points which will confirm the theories of Dr. Gysi. Those drawings are very good, and we congratulate the author. We will be able to complete this demonstration, by means of a microscopical study, to-morrow at the Ecole Dentaire. We have no microscope here, but Dr. Gysi will be at the Ecole Dentaire to-morrow and will bring his preparations, and with the microscope we shall be able to examine the different preparations which support what he has put before us.

The paper that we have just heard is very interesting, because it has been tried to find nerve fibrillæ in the canaliculi. They have been called the fibers of Tomes; they are so called in many books. It was known that they were not true nerve fibers. The new theory put forth by Dr. Gysi is an interesting one. I do not believe that it has been referred to in any books, and it has been nearly proved by the fact that when the albuminoidal substance which forms the matter contained in the dentin becomes coagulated the sensitivity diminishes from this fact.

Dr. GYSI. Yes, that is what I have explained.

The PRESIDENT. Does any member wish to make any remarks?

Dr. LAURENT. I was not here at the beginning of the reading of Dr. Gysi's communication. I do not know if it treated on the question of the treatment of sensitive dentin.

The PRESIDENT. No; this question has not been discussed.

Dr. GYSI. I have merely said that we should try to find substances which coagulate without causing discoloration of the teeth.

The PRESIDENT. Drugs of that kind are not required, for, without using drugs, heat alone will accomplish the purpose.

Dr. GYSI. Yes; but heat produces pain, and then we have to anesthetize the dentin.

The PRESIDENT. You give us the problem; you do not solve it.

Dr. GYSI. No; not yet. To explain how chemical substances produce pain when they come in contact with dentin: When this theory is regarded it might be thought that the pressure of the substances is transmitted through the canaliculi. For example, alcohol or another chemical substance produces pain though pressure is not used. This occurs on account of an osmotic action.

The PRESIDENT. You have said that the odontoblasts were the seat of sensitivity. Are they not rather the intermediary agent between the dentinal fibers and the central portion?

Dr. GYSI. Yes; because the odontoblasts are derived from connective tissue, and nerves can only come from nervous tissue.

The PRESIDENT. It is a simple anatomical question, and, as I have studied some anatomy, I have taken the liberty to make that remark.

Dr. Gysi. The odontoblasts have a nervous supply similar to that of muscle.

The PRESIDENT. They are in relation with external prolongations, with Tomes fibrils.

Dr. GUILLERMIN. I wish to point out the interesting character of Dr. Gysi's work. All those who are engaged in microscopical work know the work demanded by such delicate and fine preparations, and what Dr. Gysi has done is of a highly interesting character and shows great perseverance. Dr. Gysi spoke about coagulating the contents of the dentin in order to suppress sensitivity. If somebody could discover the right agent for this purpose he would render great service to humanity.

The president thanked Dr. Gysi for his paper, and reminded the members to be present at the practical demonstration that would be given next day in the Ecole Dentaire.

Adjourned.

SECTION II.—SPECIAL PATHOLOGY AND BACTERIOLOGY.

The Section was called to order at 4.15 P.M.; Dr. Charpentier occupying the chair in the absence of Dr. Frey.

The president called on Dr. E. R. WARNER, Denver, Col., to read his communication entitled "Some Phases of Mummification."*

Discussion.

The PRESIDENT. Dr. Warner's communication is very interesting. The mummification takes place gradually. The cells die gradually, and little by little the infectious agents destroy the pulp, and the calcareous materials produce the mummification. Dr. Warner discussed the question not only from a bacteriological standpoint, but also from a practical one. I think that we should congratulate Dr. Warner on his very important communication. He has studied with great perseverance the different phases of mummification.

The president then called on Dr. S. BERNHEIM, Paris, to read his communication entitled "Buccal and Dental Tuberculosis."†

Discussion.

The PRESIDENT. Dr. Bernheim's communication on buccal tuberculosis is a very important one. It is of especial interest for the dentist to know the buccal manifestations of tuberculosis, for we may be called upon to examine ulcerations of the mouth, and we can advise the patient to consult a physician if the ulcerations are of a tuberculous character. Tuberculosis can be treated when it begins, but when it reaches the tertiary stage the treatment becomes very difficult. Dr. Bernheim's communication is interesting from a theoretical and practical standpoint. It is very important that the dentist should be able to diagnose the earlier stages of tuberculosis, and to point out the conditions to the family physician. We must thank Dr. Bernheim for his communication.

*Printed in full at page 18 of this issue.

† " " " " " 38 " " "

Dr. FRITZ made some remarks confirmatory of Dr. Bernheim's position with regard to tuberculous manifestations in the mouth.

The PRESIDENT. I think that Dr. Fritz is a dentist to a sanitarium for tuberculous patients, therefore he has been able to see the manifestations referred to by Dr. Bernheim and to see the importance of the dentist's intervention.

Dr. BERNHEIM. I wish to add a few remarks. I want to emphasize the importance of the dentist having modern bacteriological knowledge. It has been demonstrated that a tuberculous patient can transmit the tuberculosis while singing, speaking, and dancing. Koch's bacillus can in this way contaminate the person standing before the patient. You can see how this may be. The dentist leans over the patient and examines the mouth. Now, if the patient has a reflex movement of the larynx and pharynx and coughs the disease is transmitted to the operator, who becomes a victim to his professional duty. I also want to say something about sterilization. Everyone takes antiseptic precautions with the instruments he uses. You think that the immersion in an antiseptic solution of carbolic acid, salol, or bichlorid of mercury is enough to destroy the bacillus of Koch. Well, this is an error. With these precautions you destroy all other bacilli,—the streptococci, even the bacillus of typhoid fever,—but not Koch bacillus, which is the most resistant of all micro-organisms; and, notwithstanding the precautions taken, the disease can be transmitted to a healthy person. The necessary antiseptic measure is to boil the instruments at 115° C. It is very important to have a knowledge of these conditions. You must know that you can become contaminated not only from the bacilli expectorated, but also through the conditions already mentioned. I have seen many of our colleagues who were tuberculous. Had they acquired the disease in the manner described? I do not know, because it is not always easy to discover the avenues of entrance. Nevertheless, it is a fact that among dentists we find many who suffer from tuberculosis.

What are the precautions that we should take when treating tuberculous patients? It is a certain fact that when a phthisic demands our services we cannot refuse them. When you are going to treat an individual as to whom you do not know whether he is tuberculous or not, the first thing to do is to have the patient use a tasteless mouth-wash; one of salicylate of sodium or of bichlorid of mercury. You will then have the assurance that at least the contents of the mouth will not contaminate you.

The PRESIDENT. Dr. Bernheim has not only read an interesting communication, but he also has given us very practical advice. I think that it is to our advantage to make the request that Dr. Bernheim has proposed. We should have our patients use a mouth-wash before beginning the operation.

As Dr. Bernheim has said, the Koch bacillus and the hay bacillus are most difficult to destroy. We must always think that we are operating upon tuberculous patients, and we must make them wash their mouths before beginning operations.

Dr. BERNHEIM. The request you have formulated is excellent.

The PRESIDENT. It must not be forgotten that tuberculosis is transmitted not only by instruments, but also through the atmosphere, water, curtains, etc. Dr. Warner said that it was absolutely necessary to make efforts with the purpose of suppressing tuberculosis in the country as well as in the city.

Dr. DUPUIS. It seems to me that gargles are insufficient to render the mouth aseptic. It may be a preventive measure, but we believe that these means are insufficient.

The PRESIDENT. The method proposed by Dr. Bernheim is a preventive, not an absolute one. He does not pretend to destroy Koch bacilli with gargles, for he has told you that they are very difficult to destroy. His idea is to dislodge them.

Dr. DUPUIS. The danger is still the same.

The PRESIDENT. It is lessened. We should choose his method.

Dr. DUPUIS. Notwithstanding the asepsis, the instruments that we use can transmit the infection.

The PRESIDENT. Our instruments are boiled during twenty or thirty minutes, and I think that, with the exception of the hay bacillus, all the other bacteria are destroyed. With regard to Koch bacilli, we must believe the opinion of recent bacteriological investigators, who have shown us that these bacilli are destroyed after twenty minutes' boiling.

Dr. DUPUIS. It is all right to boil the instruments, but I believe that it is better to pass them over the flame of a Bunsen burner.

The PRESIDENT. You are perfectly right, but I believe that we can rely upon sterilization by means of boiling water. I think that after thirty minutes we will secure complete sterilization.

Dr. DUPUIS. I wish to point out that the surest and most rational method consists in passing the instruments over the flame. We will prevent in this way the propagation of bacilli.

Dr. LAURENT. If a tuberculous patient comes to our office and we do not touch or use any instruments, what must we do?

Dr. BERNHEIM. You find to-day dental offices that are fixed in such a way that they can be easily washed. The office can be washed with solutions of bichlorid of mercury. I have seen many offices that could be easily washed. You ask what should be done when a tuberculous patient enters the office. Well, I will tell you what I do: After office hours I burn an antiseptic pastille, and everything in the office is washed.

Adjourned.

(To be continued.)

NATIONAL DENTAL ASSOCIATION.

(Continued from page 1083, vol. xlii.)

SECOND DAY—*Evening Session.*

THE association was called to order at 8.20 P.M.; President Smith in the chair.

Dr. Burkhart, from the Executive Council, reported, recommending that the Committee on Army and Navy be empowered to

draw on the treasurer for not more than two hundred and fifty dollars during the year, and that the committee be increased to five to further the work; that Dr. W. F. Sharp, of San Francisco, be admitted to membership; that the proposed amendment to Articles XIII, III, and IV be adopted, and that to Article VI be rejected; that the report of the Auditing Committee on the treasurer's report be adopted.

The report was adopted.

The president appointed Drs. J. Taft, W. E. Boardman, and E. S. Gaylord a Committee on Necrology.

Section I, prosthetic dentistry, crown- and bridge-work metallurgy, chemistry, and orthodontia, was called, and the report was read by Dr. W. E. Walker, stating that the papers noted below had been read before the Section, which recommended that the first named should be read before the association: "Art in Prosthetic Dentistry," by Dr. Mary E. Gallup, Boston; "The Mechanical Fixation of Teeth Impaired by Disease," by Dr. F. G. Gregory, Newark, N. J.; "A System of Removable Bridge-Work," by Dr. W. E. Griswold, Denver; "Mechanics as Related to Dentistry," by W. Storer How, Philadelphia; "Ideal Crown- and Bridge-Work," by Dr. Nelson T. Shields, New York.

Dr. Gallup read her paper.*

Discussion.

Dr. C. S. BUTLER. Having been invited by the chairman of this Section to open the discussion on Dr. Gallup's paper, I will endeavor to comply with the request. Under ordinary circumstances it would be a great pleasure for me to do so, as the paper is certainly worthy of very great appreciation, and follows closely in the line of my own ideas in regard to prosthetic dentistry. But, like many of you, I have been ill all day, and am not now in any condition to command consecutive thought, and therefore much that I wish to say must, I fear, be omitted.

There are two points in the paper which I will endeavor to speak upon, and, if I may be permitted to do so, will begin with the close of the paper, where the essayist uses the terms "occlusion" and "articulation" interchangeably, as though they were one and the same thing. I am aware that our Committee on Nomenclature has endeavored to establish the principle that these two terms may be used synonymously, or, rather, that we are to eliminate the word "articulation," using the word "occlusion" as covering both ideas. I have never been in sympathy with this action of our committee, for it seems to me that it takes but a very slight study of philology to convince one that language is not so made. One of the last judgments in philology is that words are merely arbitrary sounds for the expression and communication of ideas. They were absolutely arbitrary in the beginning, but, having become fixed in their application to definite ideas, we cannot change them. Language is not made by using one word to express dissimilar ideas. One word is

*The paper was printed in full in the DENTAL COSMOS for October, 1900, page 1007.

often used to express a whole group of ideas having a relation to one another, but one word is never used to express ideas of dissimilar character; and for this reason we should be very careful to insist upon the distinction between occlusion and articulation, for they are certainly separate and clearly defined ideas. The word "occlusion," as I understand it, means not the act of closing the mouth and teeth, but expresses the condition of the mouth and teeth at rest, while "articulation" means the act of closing the mouth; the one passive, the other active. So that the two ideas are in no sense to be expressed by one word.

Considerable time might be spent very profitably in discussing the simple act of articulation, and especially in relation to the construction of artificial dentures. It is a very simple thing in their manufacture to produce good, satisfactory occlusion. (I am not speaking of the esthetic side now.) There are few dentures that are not fairly satisfactory when the mouth is in repose, but the test comes the moment the plate or teeth are thrown into service in the act of mastication. A discussion of this phase of the paper must include a study of the glenoid cavity in all its various stages and ramifications of development, but I will not go into that here.

I do want, however, to emphasize the difference, and I hope the profession will long continue to insist upon the distinction between articulation, one of the most beautiful and instructive studies in comparative dental anatomy and prosthetic dentistry, and occlusion.

The other point in the paper on which I desire to speak is where the essayist relates her method of studying the denture in the mouth of the patient at the chair before completion, rearranging and changing here and there until the proper expression is obtained. I am very glad that this point has been brought out so nicely, because in a recent dental publication one member of our profession took the position in discussing this subject that in his practice he did not feel that it was necessary after obtaining what he called "a good bite" to see the patient again till the case was completed, his contention being that the whole operation is complete when you have obtained a good bite. Just here you can see where the difference comes in between occlusion and articulation. In getting a good bite you get simply a good occlusion, but you have no conception from that occlusion what the case will be in articulation. It seems to me that the true science and art in prosthetic dentistry is in placing these dentures in the mouth of the patient before they are completed and studying them in their relation to the patient, both in occlusion and in articulation. I cannot conceive of the possibility of producing the highest results in any other way, and in this I am most heartily in accord with the essayist.

Dr. TAFT. I can certainly not do less than express my delight at the reading of this paper. It is in a line to which the attention of the profession should certainly be very much more given than hitherto. What is the ordinary method of supplying artificial substitutes for the natural teeth? What is the aim usually? It is simply to put in the mouth in some manner that which shall represent the natural teeth,—representing them how? Simply to show

the fact that there are teeth in the mouth. That is too often the case. Now, a few words in regard to true art in the substitution of artificial teeth; that is, the restoration of the features, the symmetry and beauty of the face. How few prepare artificial dentures with a view to carrying out this idea fully. Who of us are patient enough to carry out the methods suggested in the paper? Who are patient enough to take a piece of work in preparation and give due attention to this restoration of natural form, symmetry, and beauty of the face?

The points of which Dr. Butler spoke are very pertinent, but this is a point to which attention should always be given. Some people pursue the practice of dentistry as though no importance were to be attached to the appearance of the face after artificial teeth are introduced. How often do we find that artificial substitutes distort the features and render them, shall I say, almost hideous? The question is important also so far as mastication or insalivation of the food is concerned, but the latter function is only used two, three, or four times a day. The matter of speech is also important, but neither are of greater importance than the proper symmetrical presentation of the human face, as it is constantly under observation. We are looking into each other's faces every moment, and impressions are made by the expression of the face according to whether we regard them as beautiful or as distorted. In one case we say, "How uncomely that appears; there is something strange about that face." Of another we say, "It looks very natural, very symmetrical; it is beautiful." I have known a few dentists who gave special attention to this; who studied expression under the various conditions to which humanity is subjected in pleasure, in anger, in depression, in sorrow, and all the manifestations of emotion shown upon the face. In the proper performance of this work reference must be had to these things, and we should understand them as well as the sculptor or the painter; we should study the face in these varying expressions. I have known a few dentists who spent days in the study of particular cases; those few are worthy of emulation and of all praise. I knew one man not a great while ago who spent nearly a whole week before he succeeded in getting an expression of the face of a patient that was satisfactory to the patient and to those of his immediate family, especially his wife. I have known other similar cases. If there is nothing in this, why did Dr. Allen, of former days, spend so much time on this subject? Why did Dr. Bonwill give such attention to the articulation of the teeth and the arrangement of the teeth in the mouth as he did in years gone by? Why have a few others whom I could mention done the same thing, one of whom we have here to-night with us, Dr. Walker? Why is it that this attention is given by a few practitioners while the great body of them give no attention to it, not as much as that given to the making of a symmetrical shoe for the foot or a hat for the head? The makers of those articles do give attention to these things. If a lady goes to select a hat, it must be just so or she will not have it. It must conform to the fashion of the hour, and she strives to obtain the most becom-

ing result. But too many dentists, and too many patients as well, seem to think that anything is good enough to put into the mouth, so far as the effect on the appearance of the face is concerned.

The late Horace Mann, one of the great educators of this nation, had a dentist spend nearly three days arranging the teeth upon a denture so that the proper expression of the face should be restored.

We all admire beautiful features and comely faces,—the symmetrical appearance of the different parts of which the human face is composed. When it has been mutilated by the loss of the teeth, when artificial substitutes are to be replaced, why should we not give attention to this part of our work, in which so high a degree of skill and art may be displayed? But people will say, "Oh, it will cost something." Yes, probably it will. I think Horace Mann paid two hundred and fifty dollars for that set of teeth to which reference has been made. Dr. Corydon Palmer, who is well known to many of you, often devotes several days in modeling a denture with a view to giving to the face proper form and expression. Dr. Palmer is one of our most successful artists in this direction. I wish I could inspire every dentist to work in this direction to the limit of his abilities. Is it not true that the majority of us are satisfied to insert substitutes for the natural teeth, with little or no regard to the subject of these remarks, regardless of the artistic result? When a patient is presented with a face distorted by the loss of teeth, study the face in its various conditions and note the peculiarities in detail. Study it when it is in repose; study it under the various emotions to which it is subjected, and decide what should be done here and there for the production of the best results.

There are cases, and especially before middle life, in which the removal of the natural teeth does not destroy or mar the face in a very marked degree. In others the symmetry and beauty of the face is in a large degree destroyed by the removal of the teeth. This is more frequently the case after middle life. A marked change takes place in the gums, the jaws, and the muscles of the face around about the mouth.

It is the duty of the dentist in such cases to study these changes; not only to note the loss of tissue, but the impairment of form of each and every part. Study them with a view to repair. It is not always practicable to restore the lost part to its original volume. To do that in many cases does not accomplish the object sought. A compromise in many instances between the original condition and that which secures the best results must be made.

This is a subject to which more attention ought to be given in our colleges. Study of the normal face, study by photographs, by modeling in clay, wax, or some available material, would be of great value to the student in the study of this subject. I apprehend that very few of our schools give any attention in this direction. It would be well if all could appreciate its importance.

Another point of great importance is the function of the teeth as organs of speech. Very frequently, as artificial substitutes are

arranged in the mouth, the speech is greatly impaired. This subject should also receive special attention and study by the dentist.

Mastication is another function of the teeth to which special attention should be given. Teeth are frequently so adjusted in the mouth that this work cannot be done in a satisfactory manner.

These three requirements in the substitutes of natural teeth cannot always be fully attained. Teeth may be so adjusted as to make a very good restoration of contour and symmetry and still be defective as masticators and as organs of speech, or both. Indeed, any one of these functions may be attained in a good degree, and in respect to the others failure be the result. In giving attention to one of these the others should not be disregarded. It is not possible in all cases to restore the face perfectly and at the same time have good enunciation of speech and perfect mastication.

These three conditions should always be in mind.

The arrangement of teeth that will secure the clearest enunciation will oftentimes fail in giving the most natural and comely appearance to the face. The same may be said in reference to mastication. It is true that this kind of practice requires time for its proper execution, but it should be given, at least to a far greater extent than is usually done by the average practitioner. Let us, then, in the future give more attention and persistent study in the direction here indicated than in the past.

And one thought further let me emphasize; that is, with regard to the introduction of artificial substitutes in the mouth in advanced age. Quite a large percentage of dentures are put into the mouths of persons after middle life, in declining years, and it is not always easy to know what to do in those cases. I would urge the importance of studying those cases. I spoke of the natural face in middle life, and not the more advanced stages of life, when the muscles and the parts about the face, and the whole body for that matter, have begun to change, in the way of contraction and in other expressions of advancing years, especially where the teeth are lost. This requires very special work sometimes to secure anything like satisfactory results. Perhaps all are aware of the fact that these cases are the most difficult in which to give anything like adequate satisfaction. Perhaps in these cases which come to us late in life it is not so urgent that we endeavor to attain the highest artistic ideals as it is that we endeavor to make them comfortable and to appear reasonably well. You cannot restore them to youth, but we should not for that reason pass the case lightly by and say, "Oh, it is for an old man or an old woman, and it does not make much difference how they look." How often we see artificial dentures in such cases which, so far as appearances are concerned, are conformable to sixteen or eighteen years of age and put into the mouths of patients of sixty or seventy years. In regard to shape, in regard to color and peculiar conformation, teeth should be made to conform to the age of the patient and to the peculiarities of the case all the way through. All have peculiar conformations, and dentures should be made in accordance with those indications. This

cannot be done without giving some attention and close study to each case.

Dr. CRAVENS. It is certainly a privilege and a pleasure to have heard this paper. I wish to pay a tribute to the lady for her appeal for high art in prosthetic dentistry. As to the artistic arrangement of teeth, it seems to me that the prosthetic dentist must necessarily be a compound of the portrait painter and the sculptor. How many are such I can scarcely estimate. I think there are very few.

In regard to articulation, I do not know that it would be profitable to go into any dissertation on the differentiation between articulation and occlusion, but in regard to articulation we know, or at least I think I know, that the natural teeth are never in complete articulation until primary abrasion has taken place and there is a slight flattening or formation of articular facets in the enamel at the point of contact or occlusion. And in order that the prosthetic dentist may articulate artificial teeth—that is, in order that he may accomplish complete articulation—he must be able also to reproduce those little articular facets which I have referred to as being established by primary abrasion upon natural teeth. I have a little epigram to offer, which is that *the establishment of primary abrasion is necessary to the accomplishment of complete articulation*. When the dentist does one he does the other. I think that many times when dentists spend a great deal of time in articulating a set of teeth they think they have accomplished what they desire because the plates seem to fit and to adhere closely in the mouth when the teeth are at rest, but when the patient attempts to masticate with them they loosen and are displaced. I think in many instances that is because the dentist has failed to recognize the necessity for mutual adjustment, which is the establishment of primary abrasion, in order to accomplish complete articulation.

Dr. GEO. H. WILSON. This paper has pleased me very much because it is by a lady. As a rule we expect that ladies will be more interested in other branches of our work, and that they will not take up what has been considered by many the humbler part of our profession; that is, prosthetic or mechanical dentistry. I feel that we are honored in having this lady take up this subject and discuss it, because I believe that ladies are more capable of perceiving the fine artistic side of our work than are most men. We will generally find in art to-day that ladies will succeed better than men, if we except a few rare cases in which genius appears to develop more in men than in women; but the general average of women will develop artistic talent better than men. I do not wonder they should do so, because I think they are more given to close observation. If you doubt it just notice two ladies when they meet in the street and pass each other, and when they have passed see if they were not more observing than you.

If we are going to study art we must be close observers. We must know what nature would normally produce, and how to reproduce it in art. That is the foundation of the art study.

I think there is another reason wherein we fail as dentists when we attempt the artistic, and that is a lack of proper interest in the

subject. Our tendency is to give prosthetic dentistry over to the laboratory man, who never has an opportunity to study the patient. Consequently there is no chance for him to reproduce what nature designed. The operative dentist feels that this work is beneath him, and, as I say, turns it over to the laboratory man. If we desire to make a success in this line we must recognize prosthodontia as a specialty of dentistry, and then if we are consistent we will send our patients directly to the specialist and not take the impression and then turn it over to the laboratory man to do the work. Then we will place prosthetic dentistry upon the same foundation with the rest of our profession, when it will be in the hands of those who are specially interested in that work.

I disagree with the essayist in saying that it is vulcanite and manufactured teeth which are the great causes of defective prosthetic dentistry to-day. It is simply the way in which we go at it, the fact that we do not put it into the hands of men who are specially fitted for the work. We use it simply as a means of gaining a little money for ourselves without laboring for it. I think that is the great cause of the degradation of prosthodontia.

I should like to call attention to a thought in regard to occlusion and articulation. Occlusion simply means coming together; articulation means grinding, masticating, so that the teeth will come together in the various positions into which the jaw is thrown. It is simply impossible for us to arrange the teeth by the Bonwill method of articulation, so that we can have three points of contact when we have a portion of food between the teeth upon one side. So the Bonwill articulation is absolutely worthless so far as the grinding of food is concerned, because the moment we separate the teeth and place a portion of food between them there is only one point of contact, and that is where the food is. They do not come in contact until the food is penetrated, so that there is practically nothing left between them. It is very essential that the patient shall be able to use the mouth in any position, and that the teeth shall not be dislodged. The real object of the Bonwill articulation is the arranging of the teeth so that they will occlude as they do in nature, and the result is good when the mouth is used for speech; but with mastication that is an entirely different thing. Then we must consider another element, and that is leverage. It is not always possible to arrange the teeth as nature designed them and have the leverage so arranged that they will not be displaced. So we must study the great subject of leverage. We must remember that force is always applied in a straight line, and if there is an overbite to any great extent the leverage will be in such a way that it will displace the plate in spite of everything we can do. So we must consider leverage as well as the artistic effect, and, as Dr. Taft says, we will have to compromise many times. So it means a continual study of what is best to be done in the individual case.

The essayist, in speaking of manufactured teeth, says that hand work is superior. I think that in nine hundred and ninety-nine cases in every thousand the work of the best manufacturers is far superior to hand work. I admit gum section teeth are an abomina-

tion. There are very few men who are skillful enough to produce hand-carved teeth which can compare with the manufactured work we have at the present time. Of course in the olden time everything was carved. The trouble is not with the manufacturer, because he produces the typical forms of teeth, and that is what is given us. We are to take these typical forms and individualize the teeth by grinding, and if necessary staining with the mineral stains and burning them in so as to reproduce the effects we wish. We must first have a foundation upon which to work, and that foundation is given us by the manufacturer. It is simply impossible for any man to take a piece of china or porcelain and carve it into shape, bake it and know what the color or what the exact size will be if he depends upon hand work, because we know that porcelain will shrink and we know that the color will change according to the amount of heat applied. But when we take the foundation given us by the manufacturer in the typical form of the tooth and individualize it we can produce a very successful result.

The essayist made the statement that the end of art is the concealment of art. That is very true, and that is wherein a study should be made of prosthetic dentistry. I believe that the true foundation for this is that this work should be given into the hands of prosthetic dentists. When I say "prosthetic dentists" I do not mean mechanical dentists. I do not believe in dental laboratories. I think they are contrary to the best interests of our profession. The prosthetic dentist should have full control of the work, and be responsible for all of it; then if it is a failure he cannot lay it to the operator because the operator took a poor impression, and the operator cannot say to the patient, "Well, my mechanical man made a mistake in this."

Another point requires mention; that is, in connection with the amount of technic work required by our colleges in the study of prosthetic dentistry. I think the essayist is wrong about this. The object of technic work is to teach what to do and how to do it. It is not to teach the artistic side. It is simply impossible to teach each student all the varieties of work if we depend solely upon the patients furnished by the dental infirmary; nor would a student know what to do if he were given practical work at first. But if the student is taught in the laboratory, by the use of models and dummies, how to do all the different varieties of mechanical work, step by step, advancing from the simple to the more difficult, he can cover the whole field in a comparatively short time, and then when he comes to the practical work emphasis can be laid upon the artistic side and he will meet with much better results. So I believe the way of teaching in our best schools at present is far superior to the old hap-hazard method.

Dr. WALKER. I should like to compliment the lady on the paper that we have had to-night. It was a very excellent one. I wish to reply to a few remarks made on the subject of articulation and occlusion. It is very gratifying to me to hear how much of the time to-night has been given to that subject. Generally the subject has received practically no attention at our meetings. I am glad to see that it is coming out.

The Committee on Nomenclature of this association has been striving for years to have the word "articulation" banished from our nomenclature so far as prosthodontia is concerned. I think it is evident to-night that that is a mistake. We do need these two terms to differentiate between articulation and occlusion. They are not the same thing by any means. They have two entirely different meanings. I hope, therefore, this association will reconsider its former recommendation that the word "articulation" be abandoned and "occlusion" only used instead. By occlusion, as has been said, we mean simply the coming together, the mere contact of the teeth in a position of rest, the locking of the cusps in the position of rest; while by articulation we mean the coming together of those cusps not in the position of rest, but in a position in which they are obliged to slide one upon the other to reach the position of rest. So in closing the natural teeth in mastication we first bring them together in articulation and then slide them to occlusion. Of course there are many who do not attempt to articulate artificial dentures. It is a very difficult thing to do as compared with merely occluding them. But the fact that the majority do not attempt to articulate them is no reason why that word is not necessary for those of us to use who do articulate as well as occlude. I am glad to see that Dr. Butler mentioned this fact. Few have given the extensive study to that feature that he has.

Dr. R. H. NONES. I have heard exactly what I expected to hear from a woman. Appreciation of art is nothing else than refinement; a woman I believe to be the embodiment of refinement. If we could inherit a little of that perception of refinement with our natural inheritance of mechanics I think we would better appreciate art. It has been frequently said that vulcanite work is one of the worst curses that was ever introduced into mechanical or prosthetic dentistry, a curse in the sense that it debased the ideals and abilities of the thorough mechanic, so that men are not as well versed in metal work as of old; they are not the workmen they were of old. I would add to that and say that crown- and bridge-work I believe to be the greatest curse ever introduced into dentistry, for the reason that it has ruined more teeth and debased somewhat the thorough mechanic. But it has done one very good thing of late years, it has carried the younger men particularly back to where some of these older men were; it has brought them to appreciate that they are not the workers in metal or the mechanics that they supposed themselves to be, and as a consequence I believe crown- and bridge-work should be given the credit of this extra interest that has been taken in mechanical or prosthetic dentistry. I agree, too, with the remark that was made that the word "prosthetic" has increased that interest. Very many dentists have neglected the branch of mechanical dentistry, as it was formerly termed, because of its mechanical character, feeling that a man who devoted himself to that branch was nothing more than a mechanic. The new term did away with a great deal of that, and I believe the use of the word "prosthodontia" will also help it; it covers more than the expression "prosthetic dentistry."

Another point in which I concur with the essayist entirely is her appreciation of hand work in tooth-carving. I agree with her in this sense because it makes one take more interest in and appreciate more thoroughly the individuality of the patient, causing one to carry more thoroughly in mind that individuality as an aid to an harmonious restoration. The manufacturer of teeth has departed largely from that. Many say that the manufactured tooth of to-day is a vast improvement over the hand-carved tooth. It is a vast improvement probably in a sense. We have more latitude in selection, but we do not take the work to heart as much as we did. It is not the fault of the manufacturer, but the fault of the practitioner, that a large majority of them have created the demand for purely artificial teeth; not a substitute for the natural organ, but artificial in its worst sense, the white, pearly, beautifully-shaped tooth. The majority of practitioners have created that demand, and I will say unhesitatingly that the greater number of our manufacturers of to-day do not make the artistic teeth that they manufactured even a few years ago. I have made for some years a specialty of prosthetic dentistry, and I find the greatest difficulty in obtaining teeth that are at all natural in regard to shade and shape; and I find so much difficulty that it has made me of late years almost detest this work that I once so much enjoyed.

There was another point in the essayist's paper which made me think that she did not get all her instruction in a dental college. While I am associated with a college myself, I should expect such remarks to come from one who received some of her instruction in what might be termed the pure laboratory before entering college or later.

A great deal of the fault to which I referred may be laid to the practitioner, because so many have entirely neglected prosthetic dentistry. I do not agree with some of the gentlemen who have suggested that this work should be turned over to the prosthetic dentist in the fullest sense, but I do agree with them in part. Here is probably one of the places where we may learn something from our medical brethren. We do not specialize quite enough. Another defect is that we as practitioners of the art all the way through do not take up prosthetic dentistry as it should be taken up. I do not agree with the essayist, unless I have misunderstood her, in regard to work upon patients. I do not believe she means entirely upon patients. I think she means that the earlier training should be upon models, and as far as practicable instruct students in the college, going just as soon as possible from the model to the patient. The whole foundation—not of prosthetic dentistry, but of dentistry all the way through—I believe to be first teaching the mixing of plaster. Teach the student how to mix plaster, how to handle plaster, and you have very little difficulty in making a dentist out of him. If he does not learn that he of course does not learn how to make a model, and without the making of a proper model it is almost as ridiculous to attempt to accomplish anything as it would be to attempt to build a house without any plans.

However, I did not rise with the idea of discussing the paper, but simply to express my appreciation of it.

Dr. CRAWFORD. I did not think I would say anything upon the subject, but the last speaker made a statement that was so intensely vicious in its moral effect that I must be permitted to say a word.

The great good resulting to dental surgery from the introduction of modern crown- and bridge-work has scarcely been appreciated, and it will perhaps be many years before the full force and benefit of it will be realized. The gentleman was so positive in his statement that I wanted to make an announcement or two. I did not get up to thank the essayist for her splendid paper or to engage in cajolery or anything of that kind, but to call attention to the point to which I refer.

Now, I wish to make a little contribution. Some who do not do mechanical work will perhaps not appreciate it, but I know there are a number here who will go home benefited if they will take the suggestion I make. In order to realize the full benefits of the suggestion I want to call your attention to something which depends entirely upon the introduction of modern crown- and bridge-work. First, I ask you what is the most favorable case for mechanical dentistry? It is that of an individual who has been so unfortunate as to lose all the teeth upon the upper jaw but to have a full set of natural teeth on the lower jaw. Every intelligent mechanical dentist will admit this. Now take a characteristic, typical case that is to be found all over this country, the cases of individuals who have been unfortunate not only in losing all the teeth upon the upper jaw, but who have lost enough teeth upon the lower jaw to make the characteristic edentulous gap on each side. What does modern crown- and bridge-work do? It enables the dental surgeon to take hold of that case, and by the construction of proper fastenings on either side the edentulous spaces are filled and large grinding surfaces of porcelain molars are presented, and you have restored that patient from the deplorable condition in which he was to a first-rate condition for the application of an artificial denture.

Now, another thing about prosthetic dentistry, or prosthodontia, as you have it now. The dental societies change the names so often that it is difficult to tell what they do mean. Sometimes they call it "stomatology" and "dentology," and a lot of other names. I like substantial things, in language as well as in anything else. When we get a good thing I want to hold on to it. They used to call the different branches mechanical dentistry, operative dentistry, and regulating dentistry. I will tell you what is an instructive thing to do in mechanical dentistry: Go home and take some poor unfortunate man or woman who had the teeth pulled out fifteen or twenty years ago and who has worn a set of teeth inserted by some fellow who put them in and turned the patient loose. Take the plates out of the mouth, take correct impressions, make accurate models, and then put the teeth in and articulate them so that they will open and close as they should. Then sit down and compare the difference. It will show that we can do very much more in the articulation of the teeth than we used to think, and that the forces of impact never cease to exert their effect upon the tis-

sues while the life-blood passes through them. It is a great study to sit down in front of an old edentulous mouth, or the model of a mouth that has been unnecessarily deprived of the teeth, and see the wonderful changes that have taken place under the forces of impact. I am one of those who do not believe in divorcing or separating any of the parts of this grand system of ours. It is a beautiful structure, this thing that you call dental surgery, from one end of the line to the other, a grand prophylaxis in all its bearings.

I am glad that we have had this paper to-night, and I am glad that we have had this discussion. I am glad to see the interest that has been awakened. I am glad to hear this talk about the work that some of the fathers used to do. Let us do all we can to improve prosthetic dentistry, or prosthodontia, or mechanical dentistry, or whatever you call it. If I were to seek a subject upon which to draw the strongest indictment that was ever brought against mankind, I would go around and gather up specimens of all the work that has been put in the human mouth to masticate food upon and I would lay them in one pile and then I would commence. There would be a topic on which a man could make such another indictment as Thomas Jefferson did against King George of England a little over a hundred years ago. Think of the specimens of artificial dentures which have been put out in this country with the plaster still sticking on them, furnished to a long-suffering people at fifteen dollars a set. Think of the idea of a man undertaking to put together twenty-eight teeth—I believe twenty-eight make an artificial set—for fifteen dollars! Sometimes it surprises me to think how we sit still and let the public disgrace themselves. But how many men there are disgracing themselves and their country and doing the greatest injury to the high art that we practice by making ten- or fifteen-dollar sets of artificial teeth and pulling teeth for a quarter. I say, don't do it any more.

Dr. GALLUP. In regard to what Dr. Butler said about articulation and occlusion, I had always understood and what I intended to bring out was that articulation is the swinging motion of the jaw, the act of closing the teeth, and I understood occlusion to be the teeth in repose.

Dr. OTTOLENGUI. That is right.

Dr. GALLUP. On the question of studying individual faces I have a very small collection of photographs of what I consider ideal faces, and I am making a study of them. Of course my work in that line is very limited, and my collection very incomplete at present.

I expected to be taken up on the subject of factory-made teeth. I very seldom use a set of teeth just as I get them from the depots, but perhaps take a central from one case, a lateral from another set, and a cuspid from still another, perhaps of different shades of color, and then grind them. I never put in a set of teeth just as I procure them from the depot. If the patient has retained a tooth that has been extracted I mold that in plaster and make my carved tooth from that, and get the type of tooth if I can. Of course, if the

patient has any anterior teeth I try to get my type of teeth from them. If not I have to do the best I can.

In regard to student work, I meant the working directly on models, not having a patient; and I think if dental students were put to doing continuous-gum work they would not really know the proper lines on which to make a plate. They only do it as a purely mechanical thing. I do not know that I make myself entirely clear, but I have endeavored to do so. To the gentleman who said that he thought I obtained some of my instruction somewhere else than in a dental school, I wish to say that I did have a little outside of that.

The president appointed as the Committee on Section Work Drs. James Truman, C. S. Butler, and C. N. Johnson.

Dr. E. T. DARBY, Philadelphia, wished to call attention to a rapid method of anesthetizing and extirpating the pulp, which was new to him. After exposing the pulp thoroughly it is touched with a crystal of carbolic acid and partially anesthetized. Then the canula of a small abscess syringe is introduced into the pulp-chamber, and equal parts of carbolic acid and chloroform are injected into the pulp. The syringe is not hypodermic, in that it has no needle, but the canula is exceedingly small and will enter the larger root-canals. This canula is inserted into the pulp-chamber after the partial anesthetization and packed around with temporary stopping. Two or three drops of the solution are then drawn into the syringe, which is connected with the canula, after which by gentle pressure the solution is forced into the pulp. In almost every instance he had been able to produce total anesthesia and painlessly extirpate the pulp within a minute or two.

Dr. W. E. GRISWOLD, Denver, read his paper entitled "A System of Removable Bridge-Work."*

Dr. N. T. SHIELDS, New York, read his paper entitled "Ideal Crown- and Bridge-Work."

Adjourned till 9.30 A.M. Thursday.

(To be continued.)

NEW YORK ODONTOLOGICAL SOCIETY.

A REGULAR meeting of the New York Odontological Society was held at the New York Academy of Medicine, No. 17 West Forty-third street, New York city, on Tuesday evening, October 16, 1900; with the president, Dr. W. W. Walker, in the chair.

INCIDENTS OF OFFICE PRACTICE.

Dr. S. G. PERRY. I have a word to say in reference to the matter of anchoring inlays. If an impression is to be taken the cavity must be so shaped that it will draw,—that is, made without undercuts. After the inlay is made and fitted accurately, if

*This paper is printed in full at page 33 of this issue.

we will make a little groove on opposite sides of the cavity and then in the inlay make corresponding grooves that shall come opposite these, when it is cut it will be anchored with the cement in such a manner that it will be pretty sure to stay. Of course, with a very thin inlay, there is difficulty in making such a groove without cutting the edges of the inlay and disturbing it generally, and another objection has been, heretofore, that such stones or wheels as we have had are pretty sure to blacken the inlay. Therefore I had some very thin wheels made of the carborundum vulcanized with white rubber, and you can see how thin the edges are. They are so sharp and thin on the edge that they will cut the necessary groove in almost any inlay without disturbing the fine edges, and what is more important is that being vulcanized with white rubber they leave no stain. The inlay goes in without any sign of being disturbed. After using these wheels some time they get a little dull, but if one will have a diamond, such as Dr. Delos Palmer uses for sharpening wheels and disks, they can be sharpened as one would sharpen a knife.

Dr. W. D. TRACY. For those who are not fortunate enough to possess a diamond, I would say if they will revolve the edge of the disk in a little dish of chloroform, the chloroform will sharpen it.

Dr. WM. JARVIE. I would like to repeat a conversation I had about two weeks ago with a patient in the chair, and see how the idea advanced would be received by members of this society. This lady cares for her teeth very nicely and with a fair degree of thoroughness, and she comes to me quite frequently to have what little tartar may have accumulated on her teeth removed and the teeth polished. I was speaking of the necessity for thorough cleansing of the teeth, and said that the nearer we could approximate perfect cleanliness in the mouth, the less decay would occur. I said that much time was not necessary in cleaning the teeth, but it was the intelligent use of the brush and the various other things used to clean them that told intelligence rather than time. Some people who spend a good deal of time using the brush never thoroughly clean the teeth. The lady said, "I have a person come to my house, at stated times, who manicures my nails and cares for my hair. Why would it not be a good plan to have some one come to the house, say once a month, to remove tartar and employ tape, floss silk, and other appliances so as to cleanse the mouth in a more thorough manner than one could do for herself?" About the same time, a graduate of one of our dental schools—a lady—came to see me. She had attempted to practice for herself, and had not been successful in obtaining patients. She was quite discouraged, and asked if I could put her in the way of getting a position as assistant. These two, occurring so close together, set me thinking, and I wondered why it would not be a proper thing for such a person to go to the houses of different patients and give the teeth of such people a thorough cleaning once a month or about as often as that,—why it would not be a good thing for the patient, and profitable for the person who did

it. I would like to know how such a proposition appeals to you gentlemen.

Dr. JOSEPH HEAD, of Philadelphia. We have in Philadelphia a gentleman named Dr. D. D. Smith, who is considered by many to be one of the best dentists not only in Philadelphia, but in the country. He conceived the idea of putting the patients' mouths in order and then keeping them in order for a certain sum each year, with this proviso: that they would come to him every month and have the teeth polished. Last spring he read a paper on this topic before the Academy of Stomatology of Philadelphia, and the words he said and the patients he showed were such an inspiration to many of the dentists there that, while they have not sent for their patients every month, it is quite customary for them to tell patients who are troubled with pyorrhea or with tartar to come at stated periods to have the teeth polished.

Dr. PERRY. One objection to that plan would be the fixing of any price. Fixing fifty dollars or any other price arbitrarily would be a considerable objection. The objection to Dr. Jarvie's plan would be that there should be professional qualifications; it would not be well to send around a person to one's patients who had only a smattering of professional knowledge. I consider the cleansing of the teeth one of the most important things we have to do. Sending about a person to do such work should carry with it the distinct understanding that that person is perfectly competent to do it in the office. It might be that it could be done, and in the same way that physicians conceived the idea of having private hospitals, and having patients restored to health under the most favorable conditions, and if they could not do it themselves, have their assistants do it. It is not necessary to have one's patients come to the office, of course, but the treatment must be intelligent.

Dr. M. L. RHEIN. The matter that Dr. Jarvie has presented to us is one that ought to interest the profession a great deal more than it does. I do not believe the proposition as Dr. Jarvie has put it is as new as he thinks it is. I am sure it has been placed before the profession in some form a great many years ago. I have a very distinct recollection of its being brought to our attention, but I cannot place the exact situation. As far as I am personally concerned, and that is the only way we can discuss questions of this kind, this has been for twenty years in my mind the most important point in practice. I have always felt that restoring the teeth to a healthy condition was of very little avail unless adequate provisions were made for taking care of them afterward. I have followed that principle out to such an extent as to exclude from my practice patients who refused to comply with my requirements in that respect.

I read a paper before the New Jersey State Society in 1899 on this subject, in which I illustrated the method I personally pursued in handling this very condition of affairs, and which method I had been pursuing then for some ten years. It has been my practice to train an assistant especially for this work, and for

nothing else. A female assistant, I believe, is the best adapted for this kind of work. I do not think Dr. Head's proposition that he brings from Philadelphia is a very good one, because I should consider it a decided detriment to some people to polish their teeth monthly, although there are others whose teeth should be polished as often as that. Some people do not require such attention once in twenty-four months. It seems much better to consider the condition of individual cases, and order them to report at certain intervals, according to the condition of their mouths. Then if they require cleansing and polishing, it is done at that time.

In regard to the main point as presented by Dr. Jarvie, I do not think that sending to people's houses would be a very good thing. If the person who is to do this work is properly fitted and competent to do it well, he or she necessarily possesses a great deal of ability and the time lost in traveling from one house to another, and the lack of conveniences which would necessarily occur in doing this work in patients' houses, would be of such extent that it would never be successful. If the work is worth doing, and in my opinion it is the most important work we do for our patients, to put the mouth in a hygienic and sanitary condition, it is worth while for them to visit the dental office to have it done. The plan I recommended in New Jersey is to have an office and chair especially for this purpose; then it can be done under the direction of the dentist, and he can judge of the character of the work that is done for the patient. In sending an operator to a house, it is impossible to know whether the work is done faithfully according to the dentist's ideas or not. The main point I had in speaking on the question was to oppose the plan as outlined by Dr. Jarvie, of having it done in people's houses, though being enthusiastically in favor of the profession giving a vast deal more attention to the subject of cleaning patients' teeth at regular intervals and teaching them how they can best preserve a proper hygienic condition of the oral cavity.

Unless the patient is physically debarred from going out the cleansing of the teeth should be done in our offices.

Dr. JARVIE. I had hoped to obtain something of a practical result by presenting this subject to-night. We know that patients ought to do many things regarding their teeth that they do not do, and yet when they leave our offices with teeth thoroughly cleaned and mouths in order it is with the firm intention to do all in their power to continue it in its then sanitary condition. These intentions are honest, but the necessary efforts and vigilance are relaxed, and the mouth is gradually allowed to relapse into its former unclean state.

But if such patients were called upon at stated times, say the first Monday, Tuesday, or Wednesday in each month, and had the teeth cleaned, not only might much decay and many cases of pyorrhea be prevented, but it might be the beginning of educating such to not only the wisdom but the comfort of having the mouth clean.

A dentist with any considerable practice would not wish to render this kind of service, or rather services, in this manner; but the dentist I mentioned had not been successful, owing to having no friends or acquaintances in the vicinity where she located, and is very ready to begin this work. My idea was not to have her treat cases of pyorrhea, but to confine her work to what is ordinarily embraced in the term "cleaning teeth."

The paper of the evening, written by Dr. WILLIAM HERSCHFELD, of Paris, France, entitled "Irregularity of a Front Tooth Corrected by a Porcelain Inlay," was then read by Dr. Benj. C. Nash. (This paper, with the discussion which followed, will appear in the February issue of the DENTAL COSMOS.)

ELECTION OF OFFICERS.

At the annual meeting of the society the following officers were elected for the year 1901: Dr. W. W. Walker, president; Dr. J. F. P. Hodson, vice-president; Dr. John I. Hart, recording secretary; Dr. F. C. Walker, treasurer; Dr. J. Adams Bishop, curator; Dr. J. W. Turner, editor; Dr. W. D. Tracy, corresponding secretary.

NEW HAMPSHIRE DENTAL SOCIETY.

THE annual meeting of the New Hampshire Dental Society was held in Manchester on Tuesday, Wednesday, and Thursday, November 13, 14, and 15, 1900.

The following papers were read: "Breathing, Nasal and Oral," by Dr. Arthur F. Sumner, Concord; "Pyorrhea Alveolaris, Treatment," by Dr. Geo. F. Cheney, St. Johnsbury, Vt.; "Filling of Children's Teeth," by Dr. Jennie H. Gallup, Bristol, R. I.; "The Use of the Matrix in Alloy Filling," by Dr. Harold H. Cleveland, Orange, Mass.; "Treatment of the Different Kinds of Gold: Incidents of Office Practice," by Dr. Geo. A. Young, Concord, N. H.

Mr. G. E. Johnson, Superintendent of Schools of Andover, Mass., addressed the society on "The Dental Condition of Public School Children."

The following officers were elected for the ensuing year: W. W. Cushman, Claremont, president; L. I. Moulton, Concord, vice-president; Fred F. Fisher, Concord, secretary; George A. Young, Concord, treasurer; Albert Garland, Farmington, librarian.

F. F. FISHER, *Secretary*.

DISTRICT OF COLUMBIA DENTAL SOCIETY.

At a regular monthly meeting held November 20, 1900, the District of Columbia Dental Society elected the following officers for the coming year: H. Jerome Allen, president; John H.

Loudon, vice-president; Williams Donnally, recording secretary; L. F. Davis, corresponding secretary; M. F. Finley, treasurer; H. B. Noble, librarian.

WILLIAMS DONNALLY, *Recording Secretary.*

OHIO STATE DENTAL SOCIETY.

THE thirty-fifth annual meeting of the Ohio State Dental Society was held at Columbus, on December 3, 4, and 5, 1900.

The following officers were elected for the year 1901: H. F. Harvey, Cleveland, president; Otto Arnold, Columbus, first vice-president; J. B. Beauman, Columbus, second vice-president; S. D. Ruggles, Portsmouth, secretary; C. I. Keely, Hamilton, treasurer.
S. D. RUGGLES, *Sec'y.*

BIRMINGHAM (ENG.) DENTAL STUDENTS' SOCIETY.

THE Birmingham Dental Students' Society held their annual meeting at the Birmingham University on Friday evening, November 2, the retiring president, Mr. Arnold W. Steynor, in the chair.

The secretary's and treasurer's reports were read, and showed that the society had had a very successful year.

Mr. Percy Joscelyne was elected president-elect, Mr. E. Vaughan Tomey and Mr. W. Bowater honorary secretaries, and Mr. A. H. Procter treasurer. Messrs. R. J. J. Hawkes, J. H. Harris, and F. S. Mackin were elected on the Committee for the Session.

A hearty vote of thanks was then voted to the retiring president, and also to the retiring secretaries, treasurer, and committee.

The retiring president then read his valedictory address, in which he urged the students to keep up with the times just as much after they were qualified as before.

Mr. Arnold Steynor then vacated the chair in favor of the new president, Mr. G. Y. Cale Matthews, who opened the session with a very interesting address to the students, in which he earnestly advised them to seize the opportunities which they were afforded at the university and the hospitals, and to make the most of them.

E. VAUGHAN TOMEY, *Hon. Sec.*

DENTAL SOCIETY ANNOUNCEMENTS.

NEW YORK ODONTOLOGICAL SOCIETY.

THE thirty-third anniversary of the New York Odontological Society will take place at the Academy of Medicine on Tuesday, January 15, 1901, at 2 P.M. and 8 P.M.

At the afternoon session, beginning at 2 P.M., Dr. Joseph Head, of Philadelphia, will give a clinic, showing recent advances in the methods of inserting porcelain inlays.

Other clinics of interest will also be given, after which short descriptions of the clinics will be given by the clinicians.

In the evening, at 8 o'clock, Dr. Truman W. Brophy, of Chicago, will read a paper; subject, "The Surgical Treatment of Cleft Palates," illustrated by the use of the stereopticon.

W. D. TRACY, *Cor. Sec'y.*,
46 W. 37th st., New York.

THE THIRD PAN-AMERICAN MEDICAL CONGRESS.

THE third Pan-American Medical Congress will convene in Havana, Cuba, February 5, 1901. An invitation is extended to dentists who may desire to attend and read papers before the Section on Dental and Buccal Surgery. The Committee on Transportation has made the following report on rates for the delegates at the present time: The Southeastern Passenger Association has authorized a rate of one fare for the round trip to Port Tampa, Fla., plus \$2 (exclusive of Pullman berths and meals), connecting with the Peninsula and Occidental Steamship Company at Port Tampa, which has authorized a rate of \$36.50 round trip from Port Tampa to Havana, including meals and berths in each direction. This makes the rate through to Havana from Washington \$70.05, from Cincinnati \$68.30, from Louisville \$67.55, and correspondingly low rates from intermediate points. The Trunk Line Association has authorized excursion fares to Washington, added to the fares authorized by the Southeastern Passenger Association, which includes all regular ticketing routes. The Central Traffic and Western Passenger Associations have authorized regular winter tourist rates. Delegates from these territories may find it to their interest to pay local fare to Cincinnati or Louisville and use the authorized rates from these points as outlined above. The Ward Line steamers from New York have authorized a rate, including meals and stateroom in each direction, of \$60 round trip from New York to Havana, sailing Wednesday and Saturday; time five days in each direction. Those who use the Ward Line to Havana, paying \$60 for the round trip, can return either from Port Tampa or Miami by rail. By returning the unused portion of the ticket a rebate of \$20 will be received. These tickets must be purchased from Havana over the Peninsula and Occidental Steamship Line to Port Tampa or Miami and then by rail. No rates have so far been arranged for the New England territory. The United States fast mail leaving Washington over the Southern Railway at 11.15 A.M. arrives at Port Tampa, Fla., 10.30 P.M. the next evening, making connection with the steamer leaving Port Tampa at 11 P.M., and arriving at Havana the morning of the second day. Extra sleepers will be run from New York over the Pennsylvania Railroad, Southern Railway, and Plant System to Port Tampa. The train leaving Cincinnati over the Queen and Crescent route at 8.30 A.M. will arrive at Port Tampa 10.30 P.M. the following day, connecting with the same steamer. The train leaving Louisville over the Southern Railway at 7.45 A.M. connects with the Cincinnati train at Lexington, Ky., at 10.45 A.M. All these schedules unite at Jacksonville, Fla., and go through to Port Tampa and Havana. It is suggested that delegates from the East mobilize through Washington, and those from the West through Cincinnati. Those wishing to attend will please send their own names and

addresses, and of their party as well, to Eugene S. Talbot, 103 State street, Chicago, Ill. The information will be forwarded to the chairman of transportation, so that sleeping car and steamer accommodations may be reserved.

EUGENE S. TALBOT,

Secretary, Section on Dental and Buccal Surgery.

EDITORIAL.

CROSSING THE LINE.

DENTISTRY is a product of the nineteenth century, a period which marks the greatest material and intellectual advancement, as well as the most rapid progress, of the human race. It is the era of science, of rational thinking, of broader culture, of higher ideals, of better living; and not the least among the many benefits to humanity which the century has developed is the science and art of dentistry.

It is true that sporadic attempts at dental art are recorded previous to the beginning of the century just closed; especially during the latter part of the eighteenth much progress in the art had been made, but the knowledge of dentistry was meager, and its practice limited to a few crude operations performed by the self-educated or by those who received their instruction as apprentices.

While some progress had been made in the knowledge of the anatomical structure of the teeth and their surrounding tissues, dental pathology and therapeutics was unknown; or, if the practice of the time could be considered worthy of that designation, it was nevertheless inextricably involved with the empiricism, mysticism, and ignorance concerning disease processes and their treatment which characterized medical practice in general at that period. The works of Hunter, Fauchard, Bunon, and Bourdet had appeared during the latter years of the eighteenth century, but the beginning of the nineteenth was the dawning period of an era of dental science. The contributions of Blake and Fox in England, of Laforgue, Gariot, Delabarre, Audibran, Lemaire, and others in France, were standard pioneer publications of the period which manifested the spirit of original research as their basis, in contradistinction to the speculative and empirical character of much of the contemporaneous dental literature. Following the publication of these works the specialization of dental practice gradually ensued, until, toward the middle of the century, the necessity of systematic training for dental practitioners found its material expression in the establishment, in 1840, of the Baltimore College of Dental Surgery as the first institution in the world created exclu-

sively for the purpose of educating dentists for their professional work, and during the same year the first dental association and the first dental periodical came into existence in America. Upon these three factors—the college, the association, the journal—was securely based the organization of the dental profession.

Since 1840 the development of dentistry as an organized profession with a complete educational system, a large standard and periodical literature, and an associative organization throughout the civilized world has had its growth.

What have been its services to humanity? What contributions has it made to the sum-total of human knowledge? Judged from the purely humanitarian point of view, it cannot be doubted that the most prominent benefit to humanity which has been the direct result of dental art is the relief of human suffering which its ministrations have made possible; and when we consider the fact that general anesthesia is a contribution of modern dentistry for the relief of human suffering, who will question the proposition that the practice of dentistry is a humane calling? If no other product of dental science had resulted from the work of its votaries than the discovery of this boon to humanity, that single fact would have been ample justification for its existence as a special department of the great healing art. Let those who doubt this make inquiry of the great host of sufferers who have been called upon to endure the pain of surgical operations. These know, and the spirit of their answer is poetically expressed by Professor Truman in his apotheosis of anesthesia at the memorial banquet held in 1894 in honor of its discoverer: "We cannot deify thee as the ancient Greeks would have done, but we give thee most hearty thanks and in our heart of hearts we enshrine thee, O Anesthesia, goddess of our modern civilization!—though not the firstborn, the loveliest of all the children of discovery in this our nineteenth century!"

But our services to humanity did not cease with this splendid achievement. We have demonstrated the importance of sound teeth to good health. We have in large degree unraveled the problems of the causes of dental diseases. We have established the relationship of dental disorders to other aberrations from normal bodily health. We have in a measure accomplished the restoration of dental organs lost in whole or in part by disease. We have secured to those of middle and advanced life the power of normal mastication, and by that means have not only made comfortable living a possibility for those in declining age, but have undoubtedly added to the period of human life and usefulness. We have developed an art requiring the most delicate skill for its successful

attainment, and an enormous industry which has compelled the creation of a large volume of skilled labor and increased knowledge of methods and materials which has produced an impression widely felt in many allied lines of human activity. The record is one to be proud of. That there are defects which should be remedied we all admit; that errors have arisen which might have been avoided is equally true; but, judged by its achievements, by the impression which it has made upon our civilization, by the opportunity which it affords for the development of higher ethical standards, by the relief of a large share of the burden of pain which is incident to human existence, dentistry, when fairly judged, must be accorded a high place among the developments which the civilization of the nineteenth century has called into being.

Who can define what the status of our specialty will be at the close of the twentieth century? Judged by its past, it were hazardous to prophesy. It would seem, however, to be a reasonable hope that its rate of progressive development will not be less than heretofore. The intense and growing interest which is manifested in the solution of the problems which confront us must bear its legitimate fruit, and as our knowledge increases so must in like proportion our ability to meet the conditions which our practice imposes. The indications in all departments of the healing art tend to emphasize the importance of preventive measures in the combat with disease; let us hope that the crowning triumph of the future will be the discovery of a prophylactic method by which the prevalence of dental disorders may be reduced to a minimum.

Another outcome of the near future to which we may confidently look forward is the development of greater harmony of action and ideals among the practitioners of dentistry throughout the world. Our present differences are due to differences in our points of view, and these in turn depend upon differences in our educational methods. The tendency in the latter is toward unification, or at least harmonization. The seed of this idea has already taken root, and its germ of truth will flourish until it has worked out its natural result. With a united profession working for a common end, who would be bold enough to prophesy the limits of its possibilities? The record will be written by those who come after us. Let us see to it that our endeavors are worthy of their approval.

This issue of the DENTAL COSMOS will be sent to 39,000 dentists, comprising the names of all on our lists, and through this medium we give fraternal greeting to our colleagues throughout the world, and felicitation as co-workers in one of the noblest of human callings.

PUBLISHER'S NOTICE.

THE BEGINNING CENTURY.

WITH this issue, January, 1901, the DENTAL COSMOS commences its forty-third volume of continuous publication as a monthly magazine. Previous to August, 1859, when the monthly publication began, the house published a quarterly, entitled *The Dental Newsletter*, the first number of which appeared in October, 1847, only seven years after the first dental college was established, which is usually reckoned the beginning of the era of modern dentistry.

Something of the marvelous progress of dentistry in these fifty-three years is referred to elsewhere in this issue. Of that progress the DENTAL COSMOS has been a part, as well as the faithful chronicler. It has helped to stimulate research; it has aided by the presentation of advances in a manner to most deeply impress the profession. It has aimed to be "the prophet of the higher aspirations of the profession, the torch-bearer of a wider knowledge, the teacher of a nobler science, the inspiration of a better practice."

Does any one doubt that the progress of dentistry will be any the less continuous in the coming years? Does any one think that the limit of achievement has been reached? More than ten years ago the opinion was expressed editorially in one of the dental journals that the profession was "largely written out." Yet it is an undoubted fact that since that time more and better books on dental subjects have been published than in any similar previous period; while the dental magazines have increased the quantity and raised the quality of their output. New men are coming into the profession every year; new ideas are being brought out; new chronicles of advances are being made. When this ceases the condition of stasis will have been reached, and then we may look for the decadence of dentistry, for a lessening in the quantity and a lowering of the quality of its literature.

Is any dental practitioner ready to admit that the period of stasis has arrived? No; dentistry is still marching onward and upward, attacking the old unsolved problems with renewed vigor, opening up new channels of thought and work, and bringing to the struggle greater resources than ever before, because they include all the past achievements of the profession.

The record of what other dentists do is to-day, as ever, necessary to the equipment of the dental practitioner who wishes to do the best service for his patients, which means also the best service for

himself. No matter how resourceful he may be, the reading of what others have done and are doing adds to his abilities to cope with difficult situations as they present.

The DENTAL COSMOS will continue, as heretofore, to present the best that the best minds in dentistry have to offer. The regular perusal of its pages will keep the dentist more closely in touch with what others are doing than any other course can do. More new appliances are shown, more of the practical work by which dentistry makes progress appears, in its pages than in any other dental magazine. It reports the papers and discussions of the leading societies. It illustrates papers elaborately when illustration helps to make the text clearer. In whatsoever will make it more useful to the dentist, the DENTAL COSMOS can be relied upon to do its part.

This issue is sent to every English-speaking dentist whose address we have. We shall be obliged if those who are not now subscribers will examine it carefully. We believe that such an examination by thinking dentists will result in a large number of them forwarding their subscriptions.

A blank for subscription will be found between the text and advertising pages.

THE S. S. WHITE DENTAL MFG. CO.

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler. A star (*) indicates a thesis.

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LIST OF UNITED STATES PATENTS PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING NOVEMBER, 1900.

- Nov.* 6.—No. 661,282, to CHAUNCEY C. BACHMAN. Dental polishing and finishing tool.
- “ 13.—No. 661,742, to HENRI and JOS. S. LETORD. Circuit controller for electric engines.
- “ “—No. 33,544 (Design), to BENJ. B. BREWER and W. M. H. BURFEIND. Draw plate for swaging dental crowns.
- “ 20.—No. 662,070, to HARRY F. JONES. Dental hand-piece.
- “ “—No. 662,231, to PHILIP FUNCK. Vulcanizer.
- “ 27.—No. 662,387, to VINCENT W. BARKER. Dental head-rest.
- “ “—No. 662,538, to DANIEL O. M. LE CRON. Dental appliance.

THE
DENTAL COSMOS.

VOL. XLIII.

PHILADELPHIA, FEBRUARY, 1901.

No. 2.

ORIGINAL COMMUNICATIONS.

SYPHILITIC LOCULOSIS ALVEOLARIS (PYORRHEA ALVEOLARIS).

BY G. LENOX CURTIS, M.D., NEW YORK CITY.

(Read before the Section on Stomatology of the American Medical Association, Atlantic City, June 7, 1900.)

FOR more than twenty years I have given this subject close attention, not only with a view to its cure, but to ascertain the etiology of this disease, which is generally regarded as incurable. Dr. Farrar says, "I believe loculosis alveolaris is a disease of the peridental membrane aggravated by calcareous deposits upon the teeth, which increases the inflammation so greatly that decalcification of the alveolar tissue results, and when this state exists the advance of loculosis increases more rapidly until nature makes a serious effort to expel the tooth; if this effort is successful the disease subsides and is lost from view. When all the teeth are lost loculosis ceases to be observed, showing that whatever the cause of the socket disease it does not reappear elsewhere."

In an article, "Some Suggestions on the Treatment of Pyorrhea Alveolaris," by myself, published in the *New York Medical Journal*, January 14, 1899, I gave my views in regard to its treatment. I propose now to give some of my views upon the causes of this old and destructive disease.

Up to about twelve years ago I had treated several hundred cases of what I then supposed to be pyorrhea alveolaris. But in the light of later knowledge I am of the opinion that only recurring cases were worthy of that appellation. At that time I boldly resorted to all methods then in vogue, and freely referred my cases in consultation to those whom (from their writings) I be-

lieved to know most on the subject. Degeneracy due to uric acid and rheumatism were suggested, and, as I found the rheumatic and gouty tendency in patients having the disease, I inclined to accept them as a cause, if not *the* cause. But later, when the treatment did not effectually suppress the disease, I was satisfied there must be something else behind it all which should be learned.

Reviewing the history of many of the most obstinate cases, I found that in several I could trace syphilitic association. Believing that much information might be gained thereby, I followed this trail and have continued so doing from that time. It was difficult to secure sufficient data, however, by which I could prove scientifically that which I suspected, for, as we all know, syphilis has such an insidious undermining effect, and patients are generally so unwilling to admit facts, that the study has many discouraging aspects.

It is, however, my opinion that this disease does not alone show itself in those persons who have contracted it, but may also be found in the mother as well as her offspring. It was in these cases that I found *loculosis* or *pyorrhea alveolaris* to be so well defined that I felt encouraged. But obstacles arose which retarded my speedily reaching a definite conclusion. It was my hope at this time that I might gain something by turning these cases over to specialists in syphilis, gout, and rheumatism for treatment, but the varied results led me to suspicion, and to be cautious in speech until I could get sufficient verified data to enable me to act more intelligently. In many cases I found that treatment had not been continued sufficiently long to eradicate the specific poison, or the secondary effects thereof.

In 1890 I had an opportunity to study blood, and then it was that I became convinced that the usual method of physiological study of this pabulum was inadequate. I now believe the blood carries with it the active principles of most, if not all diseases. Then the generally accepted plan for the examination of the blood was through dry and stained specimens. Even to-day that plan is largely followed. Could any but the most tenacious germs stand the baking process which is claimed to be unavoidable? Not only are such specimens exposed to the oxidizing influence of the atmosphere, but to heat which is of such a temperature that it is injurious to them; it might be said that only the "survival of the fittest" can furnish the possible opportunity of study, and then they can be recognized only after a course of staining that decorates them in "war paint," chiefs of their tribe.

In Von Ziemmsen's *Practice of Medicine*, Vol. III, page 40, we find that Kircher in 1695 claimed disease to be due to living organisms, but it was not until 1772 that Lestorfer claimed to be able to distinguish by microscopic examination of the blood the presence of syphilis and other diseases.

In 1890 Watkins, after studying various methods of blood preparation, came to the conclusion and published the fact that there was only one method of scientifically examining the blood,—namely,

doing it in its fresh state and before any changes had taken place. He also found that by instantaneously photographing fresh blood, objects which would otherwise be overlooked would be revealed and permanently recorded, showing facts that the dry and stained specimens would fail to do.

In 1892 my attention was called to Dr. Watkins's method, and it so favorably impressed me, that I have since devoted considerable time to it, and now I am so convinced that it is the only road to an accurate diagnosis of disease that I am still continuing the accumulation of data, with more or less satisfaction, having for my chief guide a sign in the mouth, which I first observed many years ago but the importance of which I then failed to appreciate.

This sign, which I denominate "egg-skin eschar," I find upon the mucous membrane extending along the ramus and the buccal surface of the gums along the molars. Occasionally it is to be found upon the cheek, near Steno's duct and the angle of the mouth. But I will not dwell upon this point, as I referred to it in the discussion of my article above alluded to.

In the early treatment of this disease, when I found this eschar present,—as it was in many cases,—I learned to associate it with some obstinate forms. Five years ago, I began sending patients to Dr. Robert L. Watkins, of New York city, for blood examination with the view of ascertaining what existed. This I did without giving Dr. Watkins the history of the case. The examination of more than one hundred cases revealed strong evidences of syphilis, and in every instance when the egg-skin eschar was found the blood showed unmistakable proofs of the taint; in fact, every case where the blood showed this the egg-skin eschar was present. Dr. Watkins has repeatedly pointed out to me the syphilitic spore. Yet I must admit that the majority of my patients declared that there was no foundation for the suspicion of the disease; but when they received treatment for it they were cured. Although some patients were honest in not knowing the history of their trouble, others did finally remember that they had contracted the disease, and still others acknowledged it at once.

So confident do I feel that my views are correct that I now treat all cases of this kind with anti-syphilitic remedies, and I find that a large percentage of them are benefited. In several cases I have been misled and diagnosed suppurative gingivitis as pyorrhea alveolaris. This I did because I could not find the egg-skin eschar, and when the blood was examined and seemed to substantiate my suspicions I refrained from giving specific treatment. To settle the question, I placed several patients suffering from suppurative gingivitis under specific treatment. This caused such unfavorable symptoms that I was soon forced to abandon it. In one case where the alveolar process on the palatal surface of the teeth was nearly destroyed and where it was practically in a normal condition on the buccal and labial surface I was puzzled to know why this affection was not general. When septic pulps, salivary calculi, and syphilis were excluded I concluded the trouble to be caused by the

pressure from a vulcanite plate, to which was attached an artificial velum that had been worn for twenty years.

In another case, the cast of which I have here, the disease was extreme in character. There was great destruction of the interdental process, accompanied with a discharge of pus. Many of the teeth could readily be forced by the finger one-eighth of an inch farther into the socket. A tumor, osseous in character, extended along nearly the entire length of the alveolar process on the buccal and labial surfaces of the upper alveolar ridge. There was, however, a break in the line of the tumor between the right central and right lateral incisor. The right central incisor had been extracted several years earlier. In this space was an artificial crown attached to a small bridge piece, as indicated on the cast (Fig. 1). The cast of the lower jaw showed by the hypertrophied condition of

FIG. 1.



the gum the extent of the pocket. At first this patient persistently denied ever having syphilis, but the evidence of it was shown by examination of the blood. After I had gained the confidence of the patient, however, he admitted that he had contracted the disease a dozen years before, but had been under treatment for it. He gave as a reason for denying the fact that he did not wish it known to any one except his physician, who had positively stated that he was absolutely cured. The patient now returned to this physician, told him my views as to the cause of the tumefaction, telling him that I said he was still suffering from the taint. The physician made light of the diagnosis and persuaded the patient not to return to me. I regret not having had an opportunity to finish the treatment of this case, as it would have been an excellent support to my belief that this class of tumor is the result of this dreadful poison. It is fair to state, however, that within a year the health of the patient so completely failed that he was advised to visit the Hot Springs for syphilitic treatment.

Where rheumatism is found to be present, in a large percentage of cases I believe it to be a coincidence and not the cause. I believe that syphilis so reduces the resisting power of the constitution that rheumatism more easily steps in, in much the same way that it may do so while the system is under any degenerating influence.

I do not wish it understood that I believe pyorrhea alveolaris exists in every case of syphilis, nor that syphilis is found in every

case of pyorrhea. But what I do believe is that some form of syphilis may exist in nearly all obstinate cases of pyorrhea alveolaris that cannot otherwise be proven. As proof of the condition I mention, such cases do get well and remain so when placed under specific treatment until all signs of syphilis cease to appear,—not only outwardly, but when the blood fails to show any evidence of it whatever.

The value of blood examination, which tells when to commence treatment and when to cease treatment, in this as in some other diseases is evident; I also regard it as of great importance in diagnosing remote causes. Indeed, I predict that the time is not far off when examination of the fresh specimen of the blood will be the principal evidence in proper diagnosis. I have sometimes thought that loculosis or pyorrhea alveolaris may be caused by mercurial poison, but investigation does not bear out this surmise, for I have found this disease where there has been no history of mercury given.

Is it not, therefore, reasonable to conclude that this form of this disease is aggravated, if not caused, by tertiary syphilis?

THE BEST FILLING-MATERIAL FOR THE TEMPORARY TEETH.

BY JOHN J. BURKE, D.D.S., MAHANOEY CITY, PA.

(Read before the Pennsylvania State Dental Society at Reading, July 5, 1900.)

MR. PRESIDENT AND GENTLEMEN: It is not without some embarrassment that I venture to intrude myself and my poor ideas upon such a distinguished gathering of learned practitioners and teachers of dentistry. I cannot help feeling my littleness, and the apparent insignificance of the sum I can contribute toward furthering the interests of dental practice. I am confronted with the ablest practitioners and the most renowned teachers in our calling, men who have given many years of effort to discover and set forth whatever is best in all lines of practice; among such it almost seems like presumption for me to announce that I can tell the best material for filling the temporary teeth, and I must not fail to preface what I may say with the explanation that I mean what has proven the best in my hands. Hesitation to make the heading of my topic too long accounts for the title as it appears on the program. A more correct heading would be something like this: "A filling-material which has given me great satisfaction in preserving the temporary denture."

In speaking to such an audience as is here assembled it is unnecessary to spend time and phrases in defense of the preserving of the temporary teeth. I take it for granted that all agree with me as to the necessity, from a professional and a humane standpoint, of caring for and preserving these teeth in order to promote the comfort and well-being of the children that come into our hands.

Nor do I suppose there will be found many who will not readily agree with the statement that no more difficult and trying phase of the dentist's work presents itself. I believe I voice the sentiment of the great majority of my *confrères* when I say that, were it not for the sense of duty compelling me to undertake this work, I would be glad to give over the filling of children's teeth entirely. But we cannot do this, and, since we must fill these temporary teeth, it of course follows that we are desirous of doing so in the easiest and best manner. To this end the material to be used must always be an important factor, and my object in this paper is to give my experience. If I can make it easier for a single dentist to perform the disagreeable and trying task I shall not have written in vain.

To all who are filling temporary teeth to their entire satisfaction, and who have found a material which suits them, I have nothing to say. But perhaps there may be within the sound of my voice some who, like myself in the first years of my practice, are feeling a need of something more easily worked; and to them I address myself, and recommend a trial of what has for nearly ten years been my mainstay in filling these teeth. It is no new material or combination of materials, but one as old as amalgams are; one which has been on the market for many years, has been used by many as a filling-material, and has been condemned as heartily as anything ever has been in our practice.

I refer to *copper amalgam*, and I presume that nearly if not all of those present are in some degree familiar with it and know its general characteristics,—how it works and how it lasts, or rather fails to last in many places. To all who have used it any description of these is unnecessary, but for the benefit of such as do not know of it I say that as a saver of soft teeth it has no equal in my experience, taking more kindly to the imperfectly calcified structure than even oxyphosphate of zinc itself, and checking decay as does nothing else with which I am acquainted. As to its working qualities, they are everything that can be desired, I think. I know of not a single point of desirability in manipulation that it does not possess, so far as the filling of the temporary or other frail teeth is concerned. There are uses to which I put it occasionally where its slow setting is a detriment, but this, in the case under consideration, is one of the points in its favor. The great objection generally urged against it is its tendency frequently to disintegrate in time, thus rendering it an uncertain filling-substance. Freely acknowledging this defect, I am still surprised that it has been overlooked as a material in operations where no great degree of permanence is looked for, as in operations on the deciduous teeth. Were its lasting quality as dubious here as I admit it to be in the mouths of adults, I should still maintain that its saving and manipulative excellences would make it worthy of use where these qualities are so desirable. But the fact that after ten years' practice with it I have discovered that it does not disintegrate in the mouths of children, but maintains its integrity indefinitely, removes from it every objection, unless you call its color an objection, which I do not in the posterior teeth, where our principal work lies. We are seldom

called upon to fill the anterior temporary teeth, and when we are, their easy approach and the lack of stress on the fillings, etc., make it unnecessary to resort to other than gutta-percha as a general rule. I confine myself in advocating copper amalgam to the posterior teeth almost exclusively, but not entirely so.

Now, the claim I make is that for filling the temporary teeth, wherever the color is not an objection, there is no material equal to copper amalgam, and I offer in support the following points:

1. It prevents recurrence or extension of decay absolutely, being antiseptic and non-shrinkable.

2. It is so plastic that its manipulation is a delight.

3. It is so slow setting that no haste need be made in the operation, although its easy working makes it possible to put in a filling more quickly than with any other material.

4. It may be placed in close proximity to the pulp, being non-irritating; and can be inserted without making pressure thereon.

It can be picked up from the tray and carried to the cavity by almost any sort of instrument, and is the only plastic I know which seems to possess as much affinity for tooth-structure as for the instrument.

5. It is not affected by the presence of saliva, either in the cavity or on the unfinished filling, as are all the other plastics; no special pains to have perfect dryness is necessary.

6. The filling is more easily and quickly finished than that made from any other substance.

But, with all these desirable and serviceable qualities, its use would be impaired did it manifest in the deciduous teeth a characteristic often noticed in the permanent,—that of wasting away on the surface, and thus becoming imperfect as a filling. This defect is the radical one in copper amalgam, and renders it unfit for general use, despite its many most excellent traits. I can speak only from my own experience, but can say that in a test of nearly ten years it has never shown any inclination to disintegrate in the temporary teeth. I have used it exclusively almost for that length of time. Such being the case, and with the working qualities mentioned, I can come to no other conclusion than that it is the material *par excellence* for these teeth.

A few words as to the procedure in an ordinary case and I am done, for I do not wish to draw out my discourse unnecessarily. If the subject is deemed of enough importance, the discussion will bring forth details. Let me state a case,—the last one I had to deal with before compiling this paper: A child of three years is brought into my office, and the announcement is made that she has complained several times recently of toothache. I look in the mouth and find cavities in the approximal surfaces of the right upper molars. With a chisel I break away the friable enamel from the cutting edge, and find extensive decay in the disto-proximal of the first molar and slight decay in the mesio-proximal of the second molar. I bur the former away freely, opening it up well, and remove the soft decay with spoon excavators. I feel sure that pulp-exposure exists, at least potentially; but, as no bleeding occurs dur-

ing the removal of the decay, I do not investigate very closely, and, applying to the region my favorite medicament, I place a pellet of copper amalgam in the cavity and with a round burnisher gently rub over the surface, pressing firmly away from the spot where the pulp is, and against the margins; add another piece in the same way, and continue till the cavity is filled. Such is the nature of this amalgam that a very firm filling may be introduced without pressing in the least upon the pulp. Now, so soft is the filling that no trouble is found in passing a ribbon saw, after which silk floss finishes the work, and I send the girl away feeling that all will be well.

When I contrast this simple and effective procedure with the one I tried to carry out before I began using copper, I confess to a feeling akin to joy. I well remember my frantic efforts to fill such a case years ago. The attempts to secure and maintain dryness, to keep the pulp from pressure and irritation, and the harrowing attempts to get a cement mix, without an assistant, which would be neither too hard nor too soft when I was ready; then the feverish anxiety in trying to get it in while in mortal dread of an influx of saliva; finally the endeavor to put some kind of finish on the already hardened filling, and the sending of the patient away with that scarcely delightful thought that I had made but a sorry job of it, anyhow.

Gutta-percha was no better; required the same dryness; heated so as to alarm the child; sticking to the instruments, and more difficult to finish than cement even.

Ordinary amalgam in such a case offered no inducement.

Thus I feel great reason to bless the time when I stumbled upon copper amalgam, and, as I have never seen it advocated for the purpose, the thought came to me that I ought to tell others what it has done for me. This I did a year ago in our Susquehanna Society, and now do here. I was loth to make any claim till a considerable length of time had elapsed in order to test the lasting qualities of the material, else I should have found occasion heretofore to offer my little experience to the great sum of which I myself have been the beneficiary.

DISEASES OF THE EYE IN RELATION TO DISEASES OF THE TEETH.

BY E. W. STEVENS, M.D., DENVER, COL.

(Read before the Colorado State Dental Society, June 12, 1900.)

FROM their anatomical and physiological relation through the same main nerve-trunk, it is natural to look for some pathological connection between diseases of the eye and dental affections; and ophthalmic literature furnishes many instances of eye diseases due to affections of the teeth, both by direct and by the so-called reflex communication. These eye affections vary in severity from slight conjunctivitis and photophobia, or temporary failure of accommodation, to absolute blindness.

Conjunctivitis and phlyctenular keratitis are often observed during teething, but these affections are so common among children that the relationship is uncertain. Most ophthalmologists hold that there is no connection between these diseases and perverted dental evolution, and that their appearance during teething is a pure coincidence. This skepticism is a logical sequence of the exaggerated notions held—and not alone by the laity—concerning the potency of dentition as a common cause of infantile diseases and disorders. There can be no question, however, that most eye-diseases of childhood are often greatly aggravated by dentition, and that during this period the child is exceedingly susceptible to ophthalmic affections, such as inflammation of the conjunctiva and cornea.

Numerous reports have been made concerning eye affections and diseases of the teeth in adults. Conjunctivitis, inflammation of the cornea, neuralgia, glaucoma, paralysis of the eye muscles and of accommodation, exophthalmos, orbital cellulitis, and loss of sight without lesion have been observed. Restriction of the power of accommodation is mentioned with special frequency. Schmidt* found loss of accommodation seventy-three times among ninety-two cases of toothache due to carious teeth. Schmidt formulates the following conclusions:

"1. That we have more or less considerable limitation of the accommodation in consequence of pathological irritation of the dental branches of the trigeminus.

"2. This may occur on both sides; when the affection is one-sided it is always on the side of the diseased tooth.

"3. It is usually an affection of the young.

"4. That the diminution of the power of accommodation is due to increased intra-ocular pressure caused by reflected irritation of the vaso-motor nerves of the eye."

Max Knies† believes that the limitation of accommodation appearing during toothache probably results simply from lack of vigorous innervation, on account of distressing pain. Spasm of accommodation has also been observed as a nervous symptom in toothache. Nictitation has frequently disappeared after the removal of a painful tooth. Neuralgias, particularly in the first and second branches of the trigeminus, injection of the eyes, and epiphora undoubtedly result from toothache. I have seen a case of epiphora in a girl twelve years of age, with perfectly normal nasal and lachrymal passages, and which was uninfluenced by the correction of a low refraction error, disappear at once after an overcrowded dental condition had been corrected. Sariguer‡ reports a case of corneal ulcer in a young man in whom extraction of an unhealthy canine tooth spontaneously cured the ulcer, after several months of ineffectual treatment with the usual remedies had been undergone.

**Arch. f. Ophthalmologie*, XIV, 1, p. 107.

†"Relations of Diseases of the Eye to General Diseases," p. 267.

‡*Rev. med. de Seville*, No. 6, 1899.

Amblyopia and amaurosis as the result of dental disease has been recorded by Lardier,* Gill,† Metras, Keyser, Samelsohn, and others. Perhaps the most striking case on record is that of Galezowski,‡ where a small fragment of wood which had entered the cavity of a carious tooth (probably from picking the teeth with a wooden tooth-pick) lodged at the extremity of one of the roots and caused absolute blindness, with dilatation of the pupil on the same side. After a blindness of eleven months the tooth with the foreign body was extracted, when the vision returned, so that on the ninth day after the operation he could see with the affected eye as well as with the other.

The most noteworthy paper upon this subject is that of Jonathan Hutchinson in the *Royal London Hospital Reports* of 1865, entitled "A Group of Cases Illustrating the Occasional Connection between Neuralgia of the Dental Nerves and Amaurosis." Hutchinson has seen neuralgia of the eyeball, with great intolerance of light, cured by the extraction of a carious molar tooth. Hutchinson has also observed spasm of the extra-ocular muscles during toothache. Garretson§ reports a case of pain in the eye with dilated pupil of two years' standing, caused by an encystment of a canine tooth. The breaking up of the cyst and removal of the inclosed tooth was followed by almost complete cure before the patient left the office.

Purulent inflammation of the orbit has been known to result from caries of the upper teeth. Pagenstecher,|| Burnett,¶ and Vossius** have reported cases of this kind. W. E. Bruner†† reports a fatal septic thrombosis of the cavernous sinus following extraction of one of the back molars. The patient presented all the symptoms of metastatic orbital abscess, along with septicemia, of which he died three weeks after the tooth was extracted.

According to C. S. Bull,‡‡ the most common cause of purulent inflammation of the maxillary antrum is caries of the alveolar arch and disease of the teeth, especially of the posterior molars; first forming subperiosteal abscess, and then abscess of the antrum itself. The affection may extend from the antrum to the orbit. The orbital symptoms are more or less displacement or protrusion of the eye, orbital cellulitis and chemosis, loss of vision from neuro-retinitis or atrophy, due to pressure on the optic nerve and obstruction to the return circulation, and panophthalmitis from strangulation of the tissues. Many cases of empyema are so slow and insidious in their progress and so slight in their symptoms that their existence is unsuspected until some violent retro-ocular or

**Rec. d'Ophthalmologie*, 1875, p. 87.

†*Jahr. f. Augenheilk.*, p. 373.

‡*Arch. gen. de Méd.*, XXIII, pp. 261-264.

§"System of Oral Surgery," p. 786.

||*Jahr. f. Augenheilk.*, 1884, p. 620.

¶*Ibid*, 1885, p. 16.

***Arch. f. Ophthalmologie*, XXX, 3.

††*Ophthalmological Record*, July, 1899.

‡‡*Trans. Section on Ophthalmology, Amer. Med. Assoc.*, 1899.

orbital inflammation or some grave cerebral complication demands a careful investigation of the cause.

The disease may extend to the orbit by means of the lymphatics and by means of the veins, but the most frequent channel by far is through the floor of the orbit by osteo-periostitis.* The floor of the orbit is very thin, and often shows openings through which the infection is propagated directly from the antrum. If the case pursues an acute course we have a train of symptoms which is easily followed: Beginning with dental caries, inflammation of the sinus, closure of the ostium maxillare, symptoms of pus-retention, necrotic osteitis of the roof of the antrum, orbital cellulitis, and then, if the case is not radically treated, osteitis of the roof of the orbit, abscess of the brain, and death. If the course is a chronic one the progress is much slower and more insidious, until a marked failure of vision reveals optic neuritis or atrophy due to retrobulbar neuritis.†

In the ophthalmological books and text-books of to-day little or no mention is made of dental irritation as a cause of eye affections. This neglect has probably been due to the fact that medical men know nothing of dentistry. A wide field remains, from a medical point of view, for further observation and research in respect to the treatment of affections influenced by dental irritation coming under the physician's care. Dentistry as a branch of surgery should occupy its place in the domain of medicine, and there is every reason why a more general knowledge of the teeth should prevail among physicians.

The relationship between the different specialties and their connection with general medicine is mutual. The study of constitutional diseases and affections of different organs of the body, as the kidneys, the brain, and the spinal cord, often has an important significance in relation to the diagnosis and correct understanding of diseases of the eye. On the other hand, eye symptoms often apparently insignificant sometimes lead to far-reaching deductions concerning the primary and originating affection; and, as Garretson says, "a diseased tooth may express itself in almost any part of the body, while, on the other hand, disease in any part of the body may express itself in discomfort through a tooth."‡

In conclusion, dental affections may cause varied symptoms in the eyes. Whenever painful or inflammatory conditions of the eye from unknown causes occur, and persist in spite of treatment; when there is suppression or diminution of visual activity which cannot be explained by ophthalmoscopic examination, by changes in the intra-ocular tension, or by cerebral complications,—in all these cases the teeth should be carefully examined, and, if any lesion be found, appropriate dental treatment should be at once instituted.

*Bull, *loc. cit.*

†*Ibid.*

‡"System of Oral Surgery," p. 788.

OUTLINE AND DETAIL MEDICAL STUDY.

BY C. M. WRIGHT, D.D.S., CINCINNATI, OHIO.

THE prominence of the laboratory in modern methods of teaching medicine and other sciences, even including psychology, must have changed the general aspect of these fields of knowledge. We of to-day have a different view of medicine from those who studied even half a century ago. To-day we look to the physiological, pathological, bacteriological, and chemical laboratories, equipped with ingenious implements of research, for our facts in medicine, and we get clear pathological distinctions and curious physiological phenomena in nearly every tissue and location. The doctrines of nutrition, circulation, and energy, the theories of secretion, waste, digestion, and metabolism have a significance to the modern pathologist not entertained by his predecessor.

The broad, inexact, general doctrines of the older practitioner can be likened to the outline or sketch in the making of a picture; but the picture, to be perfect, must be afterward filled in with the more carefully studied detail. The two treatments are necessary in the complete work of art,—the bold, sketchy outline and the harmoniously worked-in detail. The older medical student mastered the outline at the bedside; the modern spends his days and nights in the laboratory with the detail. We cannot say that the work of one is greater than that of the other, but that one without the other is incomplete. The specialist who devotes his life to a patch of mucous membrane, its supporting tissues, its supplying nerves and bloodvessels, and who, with high-power lenses and various reagents and stains and *methods*, isolates and defines the reticulating spongionoplasm of the cells of the special field and cultivates an intimate knowledge of the life-history of a minute portion of the organism and the disasters liable to occur in it,—is doing splendid detail work.

Some conservative writers of the older school have, every now and then through medical journals sounded the warning that the devotee to detail—the specialist—neglects the study of outline, or the general principles of medicine, and that to-day the perfect picture is not produced. This claim may be just.

We, as specialists, have done fine work, and made for ourselves an enviable reputation in this detail work in medicine. In the departments of special histology, embryology, etiology, and in mechanical and chemical therapeutics we stand in the front rank, abreast with the laryngologist, the rhinologist, the ophthalmologist, or any other specialist. And while we can point with pride to our accomplishments, the blush must sometimes come to our cheeks in the privacy of our libraries (or laboratories) at our self-recognized want of knowledge of the broad principles of medicine, which was the specialty, so to speak, of the older practitioner of medicine, and perhaps of dentistry.

We sometimes, too, try to console ourselves by rough and hasty illustrations and by comparisons,—compare the inexact and broad statements of the early writers on scurvy of the gums, and their

systemic treatment by a diet of green vegetables and by alterative medicines, and our modern studies in gingivitis and the carefully worked-out surgical and topical appreciation of therapeutics. There seem to be grounds for self-congratulation, yet we may be compelled to resort to the diet of green vegetables and alterative medicines, and to wonder at the wisdom of our fathers, as we approach broad and complete doctrines of this class of local manifestations of disease. We may be compelled to recognize the fact that a combination of the best outline work with the beautiful detail work of the specialist is the only truly scientific position.

In caries of the dentin, the etiology of which has been so carefully worked out in detail by our great *confrère*, Miller, there still appear pronounced phenomena in the history of the disease, apparent to the older practitioners, which might be called chair-side problems, which point to deeper and more general and more obscure causes as active factors in conjunction with the superficial and local causes so clearly demonstrable in the laboratory.

If we are great at detail and weak in outline work, the questions arise, Are we, as dentists, behind other specialists in this general knowledge? And, if the neglect of the deep study of general principles is a tendency in all specialties, what means can we recommend for inciting to broader culture? Or, to carry out the simile, what shall we do to bring up our outline work? Shall the dentist and other specialists acquire a medical training by the practice of medicine before entering upon special practice, as some advise? Shall we have more medicine taught in our dental colleges, with enlarged hospital privileges, as favored by European schools? Shall we read more medical journals? Or shall we accept the narrow field as sufficient unto our capacity (as is the tendency of the times in colleges and universities), and continue our devoted efforts to perfecting the detail, leaving to others the outlining?

There are pros and cons in the consideration of these questions, but the time is ripe for a decided announcement of the dentist's position in regard to them. From the indications presented in our dental journals, from the agitations of state boards of examiners, and from the alertness of college professors, who must trim their sails to meet the winds that blow from two quarters, the writer dares to predict that the prescription pad and systemic or internal remedies will be as potent weapons in the hands of the dentist and other specialists in the future as are the digital dexterity and instruments of to-day.

IMPORTANCE OF A PROPER BISCUIT BAKE IN PORCELAIN WORK.

BY WM. A. SPRING, D.D.S., DRESDEN, GERMANY.

HAVING to a large extent worked out my own salvation in porcelain work, and having learned to avoid blunders through having committed them, I consider myself more keenly aware of the bad results of improperly treating this most valuable material than

those who have been guided to success by experienced men; and I feel constrained to mention some things which older porcelain workers have evidently deemed too simple or too self-evident to deserve notice.

In all dental porcelain work, whether continuous gum, crown, bridge, or filling, it is advantageous to bake twice. Porcelain in fusing shrinks one-sixth its bulk, and one is able by two bakings to gauge accurately the size of the piece. It is of vital importance that the first should be a biscuit bake. If overfused, the next bake will be porous. One may grind away the surface and cover with new body, and even use low fusing; the result is always the same,—porous. It is surprising how very rough, dirty, and unsatisfactory the final fuse will turn out if the biscuit bake is overdone. The work passes from a condition of underdone to one of being overfused, without reaching a proper glaze. More harm results from overfusing than from underfusing the biscuit bake; but underfusing may prove very harmful, as the final bake may shrink so much as to cause distortion in the finished case. If the first is a good biscuit bake, the last bake will render a beautiful, clean, strong, shining piece of work. The strongest kinds of dental porcelain become weak and insecure if improperly baked. If one has been so unfortunate as to improperly bake either a crown or bridge, resulting in the rough, untidy, porous condition mentioned, there is no cure. All the porcelain must be removed, and that part of the work done over from the beginning.

How, then, is this important biscuit bake to be recognized? It does not resemble the biscuit bake of table china, but has a somewhat granular appearance, with small shining facets over its entire surface. I think it the duty of every beginner to see a good biscuit bake in the laboratory of some skillful porcelain worker. Once seen, it will never be forgotten.

It is an interesting fact that while porcelain will not endure a second fusing after it has been well glazed, glass will, and is in fact toughened and strengthened by it. All glass fillings and dental porcelains which fuse at 1800° F. or less may be glazed with every bake, and baked any number of times. If one uses Ash's, Consolidated high-heat, or Close's body, a proper biscuit is essential. I may here state that while one may not add porcelain of the same grade to a surface which has been fused to a glaze, one may use a lower-fusing porcelain. Continuous-gum cases are repaired with a lower-fusing body. A continuous-gum case of Close's body may be repaired with Close's low-fusing or with Consolidated continuous-gum body. If one has overfused the biscuit bake of a crown of Close's body, one can make the final bake of Close's low-fusing, of Consolidated body, or even a combination of Close's with Downie's body. If one-third the latter be added to Close's body, it reduces the fusing-point quite enough. The mixing should be thorough, and can be accomplished by moistening the powders and mixing with a flexible horn spatula on a glass slab.

The following table may be of help to beginners:

Close's body fuses.....	at above 2600° F.
Ash's high-heat fuses.....	" " 2600
Consolidated fuses.....	" " 2500
Ash's low-heat fuses.....	" " 2400
Downie's fuses.....	" " 1800

There is no objection to fusing a low-heat body in a heat sufficient for a high-heat body, the work being simply accomplished in a shorter time. A filling of Consolidated high-heat fused in a Revelation oil furnace in one minute and forty seconds is just as strong, provided it has been accurately fused, as if it had been done at a heat which required five or six minutes. It must be admitted, however, that the danger of overfusing is greater, therefore a less heat is to be recommended. I prefer high-heat porcelains; Close's for crowns and bridges, and Consolidated for fillings. Close's body can be biscuited in three minutes and fused to a beautiful glaze in four minutes, and I find it just as easy to work as any of the low-fusing bodies. One can get it by special order made up in any of the colors of the S. S. White Dental Mfg. Co.'s shade ring, but it is marvelous how many bicuspid and molar crowns are perfect in color when made of the regular body.

I do not use facings except in front crowns, but carve and bake in one piece crown or bridge. Much time is saved and more natural crowns secured by this process. My method is as follows: A bicuspid root, for instance, is prepared as for a Richmond crown, except that the cap is of platinum and the pin of square iridio-platinum No. 14 gauge. The pin, after being hammered into the

FIG. 1.



FIG. 2.



FIG. 3.



shape of the Washington monument and soldered, is cut off, leaving less than one-eighth of an inch protruding. (Fig. 1.) It will be easily seen that the shape of this protruding portion is right to retain the porcelain which is to be baked upon it. The buccal portion of the cap, which was already beveled to avoid showing the band, can be considerably more beveled at this stage by grinding. If the band is soldered with gold alloyed with twenty-five per cent. of platinum, it is not necessary to lap it. This can be done with the ordinary blow-pipe. Soldering the cap and pin is as well done with pure gold. The cap and pin thus constructed is placed upon the root and a bite impression taken with modeling compound.

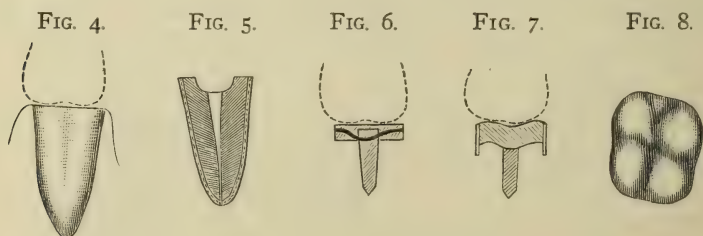
Before putting into the anatomical articulator, the inside of the band and pin must receive enough wax to permit its easy removal from the plaster model. After the articulator is opened and the wax removed from model and cap with boiling water, the cap must be heated in the furnace to evaporate any possible wax. Close's body is then placed upon the cap, enough to well cover the pin, and biscuit baked. (Fig. 2.) As soon as it is cool, it is placed

upon the articulator, more body is added, carved to shape and articulation, and baked to a finish. (Fig. 3.)

My method of making a porcelain bridge is simpler than any I have seen described. After the platinum frame, consisting of caps, pins, saddle, and square bar of iridio-platinum, No. 14 gauge, has been constructed, a well-rounded portion of Close's body is biscuited upon it, taking care that it shall not be when baked quite as high as the articulation of the finished piece requires. This piece is now placed in position in the mouth, and a bite impression of modeling compound taken. After waxing the caps, it is placed on the anatomical articulator. After the plaster is hard, it is removed from the model, the wax boiled out, and the piece once heated in the furnace. It is now placed on the articulator, Close's body added, the teeth carved to articulation, and baked.

Allowance must be made in the size of the teeth for the shrinkage of the porcelain, but no allowance need be made in the articulation if the biscuit bake has nearly reached the occluding teeth. The end teeth should project, as the contraction is all toward the center. Such a bridge of four or five teeth can be carved in about an hour and baked in four minutes.

My method of crowning with porcelain a molar with an abnormally short bite is as follows: Having a lower molar worn nearly



to the gum, I grind it a little shorter, and, after making the walls parallel, I band it with platinum slightly alloyed with iridium. The band must be left as high as the occluding tooth will permit.

After enlarging the roots for the pins and grinding the center at the bottom of the pulp-chamber to secure a firm base, I fit pure platinum plate accurately to the surface, carrying it to the bottom of the pulp-chamber. A bit of modeling compound will hold this in apposition to the band so it can be removed, invested, and soldered. Then the pins are placed and soldered. This platinum base is now placed upon the root, and a bite impression taken. Two bakings are necessary to make a beautiful carved crown.

As will be easily seen, the distance between the occluding molar and the bottom of the pulp-chamber is quite enough for a strong crown, since the porcelain is inclosed in a strong platinum band. Once in the mouth, the band is visible only upon close inspection.

Figs. 4-7 show the steps of the process; Fig. 8 shows the finished crown.

I think this crown is new.

A PLEA FOR ANTISEPSIS IN THE PRACTICE OF DENTISTRY.

BY GEORGE W. GUTHRIE, M.D., WILKES-BARRE, PA.

(Address to the Susquehanna Dental Society, delivered at the meeting of the Luzerne and Lackawanna Dental Society, May 2, 1900, at Wilkes-Barre, Pa.)

MEMBERS OF THE SUSQUEHANNA DENTAL SOCIETY: In this day of rapidly advancing ideas, when science is constantly revealing new things to the student, it behooves the professional man to be on the alert; no one, however industrious he may be, can keep abreast of the great march of thought if he stay in his office and simply be a student. It requires the association with one another, the interchange of ideas, the comparison of methods, that are to be found only in well-ordered and well-maintained societies. Again, the meeting together in this manner prevents the growth of envy, jealousy, and discord; it creates harmony and good-fellowship. This is common to humanity: keep people apart and they misjudge one another and see only the disagreeable traits of character; bring them together and "the touch of nature that makes the whole world kin" will have its influence, the good traits will be recognized and friendship engendered. Show me a man who does not attend the meetings of the societies of his guild, and I'll show you a man who is either professionally behind his fellows, or who is disqualified for membership on account of unprofessional conduct,—who is either behind in the race, or a fakir. It is idle to argue a lack of time or opportunity; the busiest men in the profession are the men most active in the societies. We are very much the creatures of inclination,—we usually find time to do the things we most wish to do. This is generally true of us in all the affairs and duties of life.

But there are other reasons why thorough, live professional organizations do us good. The above benefits are in the main personal and subjective; other benefits are more general and objective. Thorough, active societies are necessary to scientific progress. Time will not permit me to develop the thought; it is self-evident. Live societies give strength and respectability to the profession. The world respects power,—the power of numbers and intelligence. In this day of the fakir and professional guerrilla, it is necessary for every respectable man to array himself under the banner of professional honor. Such organizations will give the profession an influence in molding public opinion, in having suitable laws enacted for the protection of the public, and in seeing that those laws are executed. Much has been done both in your profession and mine along this line, but much still remains undone.

Ever since your committee did me the honor, a short time ago, of asking me to address you on this auspicious occasion, one thought has been constantly in my mind,—What shall I talk about?—and I have finally decided to direct your attention to a few thoughts on "A Plea for Antisepsis in the Practice of Dentistry." Your work has made rapid strides since my boyhood days, when "filing and plugging teeth" was supposed to cover the

ground. Then it was a trade; now you belong to a profession. Your studies in anatomy, physiology, pathology, not to mention the subjects embraced under the practice of medicine and surgery, place you very closely parallel with the studies embraced in my profession. The wonderful new study, bacteriology, also belongs to you, and the germs that find their habitat in the mouth are as important as those in any other part of the body.

The germ theory of disease has come to stay. The scientific mind, both lay and professional, believes that all infectious diseases are due to the invasion of the system by the lowest forms of vegetable life, known variously as germs, micro-organisms, microbes, or bacilli; and more than that, the entire surgery of wounds and very much of the medical practice is based upon this theory. All good modern surgery is antiseptic surgery, and all antiseptic surgery recognizes that the danger to wounds arises from their liability to contamination with these germs.

The mouth is the abode of countless numbers of germs, and of many varieties. "It is an unruly evil, full of deadly poison."

First, then, I would say that the dentist should practice the most rigid antiseptis for his own protection. His field of operation, the mouth, is the abiding-place of many of the most dangerous diseases of the human system; need I mention more than tuberculosis and syphilis? And there are the whole family of the exanthemata,—measles, scarlatina, smallpox,—all with distinctly marked mouth manifestations, and the danger from infection by pus from necrosed bone is patent to you all.

Physicians know that patients suffering from mucous patches from syphilis frequently go to dentists for treatment; and who does not have to treat tuberculous patients? Think of the myriads of tubercle bacilli the mouth of a tuberculous patient must entertain! To my mind there is more danger from such a patient than from a case of smallpox. Medical science has given the world a sure and efficient protection against smallpox in vaccination, but there is no such protection from tuberculosis. How important, then, is it that the dentist should be fully prepared to protect himself against these dreadful scourges to humanity!

But, secondly, the dentist should practice the most rigid antiseptis for the protection of his patients. All the teachings of modern medical science lean to unselfishness. The surgeon's apron was once worn to protect his clothing; now it is sterilized and rendered germ-free to protect the patient. The nurse's cap was once used to protect the hair from dust; now it is used to prevent dust and other particles from the hair contaminating the field of operation. Rubber gloves and finger-cots were once worn by the operator to protect himself from infection; now they are worn, like the apron and the cap, to prevent infection of the patient. Dr. Kelly says we are not responsible for the germs that may exist in the part to be operated on, but we are responsible for any germs that we may carry into the part.

And now the question arises how best to prevent infection, how best to combat these infectious agents that are ever confronting

us? Thanks to modern science, there are a number of well-recognized germicides, germ-killers; and first in the list stands *heat*. The fire shall try every man's work of what sort it is. "Purified as by fire" is an expression older than the language we speak. Heating to 212° Fahr., the boiling-point, will destroy all forms of germ life.

Then follow a number of chemical germicides,—corrosive sublimate, oxalic acid, potassium permanganate, carbolic acid, chlorin, sulfurous acid, formalin, lysol, creolin, hydrogen dioxid, boric acid, salicylic acid, and alcohol.

All well-regulated surgical sterilization includes several parts that require especial attention. First and most important—*the hands*.

"Who shall ascend into the hill of the Lord? or who shall stand in His holy place? He that hath clean hands and a pure heart; who hath not lifted up his soul unto vanity, nor sworn deceitfully." (Ps. xxiv, 3, 4.) This was the requirement of the priest under the old dispensation. I consider there is no irreverence in making this quotation, and applying "he that hath clean hands" to the work of your profession and mine. The priest stood in the holy place before the altar, surmounted by the cherubim, between whose expanded wings Jehovah was manifested. Every man who practices surgery, especially the surgery of wounds, stands in a holy place, with nothing between him and the citadel of life but the cuticle or the epithelium, a break in either of which may expose the patient to a horde of ruthless invaders inimical to human life.

How, then, are the hands to be made clean? All authorities agree that the most important agency is soap and water, and a nail-brush,—thorough washing with laundry soap, or green soap, and a nail-brush that has been previously sterilized, for ten minutes, changing the water three times, is Dr. Kelly's rule, paying especial attention to the nails. After this there are two methods, a long method and a short one; the former to be used when the hands have been especially contaminated, or when the operation requires the opening of a serous membrane, as the peritoneum, a joint, or the brain. It consists of staining with a saturated solution of potassium permanganate, then bleaching with a saturated solution of oxalic acid, then immersing in a solution of corrosive sublimate, 1 : 2000, then rinsing with sterile water. The short method follows the thorough scrubbing with an immersion in bichlorid solution, afterward rinsing in sterile water.

Obviously heat, the greatest germicide, cannot be used to the hands directly, but the best operators are now using for their most important operations long rubber gloves sterilized by boiling, and thus work with a boiled hand.

For your work it is obvious that the shorter method of sterilization mentioned above is all that is required, unless it be in the case of a very contagious disease, as syphilis or tuberculosis, when the dentist would be justified for his own protection in using the rubber glove.

Second in importance in the matter of clean surgery is the sterilization of *instruments*. Here again, thorough scrubbing with soap and water and boiling are all that are necessary. Dry heat, as by passing the instrument through the alcohol flame, is very efficacious, but it is apt to interfere with the temper of steel. Probably the mirror is the most difficult problem under this topic. Boiling is apt to interfere with the reflecting qualities of this instrument, by vaporizing the mercury. Here thorough washing with soap and water, and immersing in alcohol, or a solution of lysol, $\frac{1}{2}$ per cent., will make the instrument comparatively clean. A very convenient device for office sterilization is the arrangement of two copper trays, one inverted over the other; the heat is generated by two alcohol lamps, in which wood alcohol is used. In a very few minutes water is made to boil, and an exposure of from three to five minutes is all that is necessary. In my office work I make it a practice to sterilize all instruments used in making examinations where there is the slightest reason to suspect infection. This is very easily done: an office-boy can handle the sterilizer; in fact, any one who can light a match can sterilize instruments by this device.

Next in order in the way of sterilization come the materials used in your work,—napkins, towels, rubber tissue, and the various metallic substances used. Towels and napkins from the laundry may reasonably be supposed to be surgically clean. I believe no clean dentist thinks of using rubber tissue more than once. Thorough washing with soap and water and immersing in bichlorid solution, 1 : 1000, and subsequently rinsing in sterile water, will render this material comparatively clean. But the experience of surgeons with rubber gloves demonstrates that rubber dam may be boiled, if the operator deem it necessary. The metallic substances used in your operative work are rendered sterile by the practice of passing them through the alcohol flame,—which is found necessary in much of your work,—and this practice may be applied in the case of all such substances as are used in filling cavities, and in crown- and bridge-work.

And last of all comes the field of operation, *the mouth*. It is evident that surgical sterilizing here is not possible. But to recall Dr. Kelly's remark, we are not responsible for the germs that may exist in the mouth; we are only responsible for those we carry in. Auto-infection, self-inoculation by the patient, is not probable. If the operator has sterile hands, sterile instruments, and his dressings and materials are sterile, there is little likelihood of the patient becoming infected.

But much may be done even in the way of cleansing the mouth, especially the part that is set aside by the protecting rubber as the field of operation. Alcohol and lysol in solution, phénol-sodique, listerine, are all admirable cleansers; not to mention boric acid and salicylic acid in the form of Thiersch's solution.

Now, I hear some of my conservative friends say, Is this necessary, in whole or in part? Some will say the work is dry work, there is no traumatism, and thus no danger of wound-infection;

but let me say, my friend, that there is danger of traumatism, and the slightest abrasion of the mucous membrane may be the portal through which the greatest danger may come to your patient. It has been my experience to have one patient, a young girl, with a syphilitic sore on her lower lip, which she positively asserted came from a crack caused by the stretching of the parts while the dentist was applying the rubber dam. I tried my best to shake her faith in this statement, but was not able to do so; she stoutly denied that there was any other source of infection. Certain it was that this girl contracted a syphilitic sore of her lower lip which was followed by secondary manifestations of the terrible malady; and that she believed and still believes that she contracted it in a dentist's chair. And, gentlemen, such a calamity is possible in the absence of thorough surgical cleanliness such as I have described above.

It is not always dry work; but granted that it is dry work, there is still danger. We all know that syphilitic primary sores appear where there is no apparent traumatism of the mucous membrane; we know also that tubercle bacilli find a lodgment in the mucous tracts, and produce their terrible results without the existence of a wound of the surface. In the light of modern antisepsis there is no minor surgery; every wound, however slight, as stated above, may be the portal through which a horde of malign invaders may enter the human system. We all know how the brilliant Anstie lost his life from the prick of a needle while doing a post-mortem after peritonitis, and how Hunter, Agnew's assistant, in the early seventies died from infection following an operation for necrosis.

We are now in the gloaming of the nineteenth century, a century the best this old world has ever seen, full of mightiest achievement in war and peace,—for peace hath had her victories no less renowned than war, and no victory won has been more grand than the victory science has achieved and is achieving over disease and over death; and the greatest instrument is surgical cleanliness. Wesley said that "Cleanliness is next to godliness," but in our art cleanliness is godliness; surgical cleanliness is surgical godliness.

GOLD-BLINDNESS, OR RETINAL ASTHENOPIA AND ITS TREATMENT.

BY L. WEBSTER FOX, A.M., M.D.,

PROFESSOR OF OPHTHALMOLOGY IN THE MEDICO-CHIRURGICAL COLLEGE, PHILADELPHIA, PA

(Read before the Pennsylvania State Dental Society at Reading, July 5, 1900.)

My attention was first called to this defect of vision five years ago by a gentleman of your profession, who at times lost the power to distinguish the gold from the walls of the tooth after working on the tooth for a short time. At first several months intervened before this repeated itself, but as time went on it became very annoying and the intervals of attack grew shorter, so that he became alarmed and sought my advice about it. Since then I have had a great many similar cases, and the frequency with which it occurs

and the treatment for it is my plea for bringing the subject before an association who, more than any other body of men, are interested.

Retinal asthenopia means an abnormally rapid exhaustion of the vision. The sight fades away; the object looked at gradually disappears, especially when the eyes have been fixed upon a certain small object for a longer or shorter time. This condition of retinal exhaustion is exaggerated when such a warm color as yellow is the color under observation, or when the eye is overstimulated by an electric or Welsbach light. Age does not predispose to it nor youth exclude it, for during the past winter I had six young dental students who were all similarly affected, and as many practicing dental surgeons past thirty-five years of age. A history of one is the history of all, yet other factors than simply retinal exhaustion enter into the causation of this defect.

This particular form of asthenopia and the subsequent scotoma (blind spot) is, in my judgment, primarily produced by the excess of yellow rays from the gold metal, which first overstimulate the rods and cones of the retina and then, as a sequela of this overstimulation or excessive vibration, exhaustion follows and scotoma or blind spot is the result. "It is well known that looking through a yellow glass at first causes a very decided feeling of being dazzled, although, objectively, less light enters the eye, inasmuch as the violet rays are removed."

I know an individual in whom nausea is produced whenever she looks at a large object painted yellow; the vision becomes too much stimulated, and by reflex action through the retina and optic nerve, the brain, and the great sympathetic nerve, the sensation of nausea is produced.

In former years marksmen used yellow glasses to improve distant vision. It is also well known that in the higher altitudes men see farther on account of the rarer atmosphere; then, too, owing to the absence of moisture in the atmosphere, the yellow rays have more power of stimulating the rods and cones of the retina and act like a yellow glass. It may be easily understood that if the yellow rays have the power of so overstimulating the retina in high altitudes, how much more will any yellow metal bring about gold-blindness when the vision is concentrated upon it. The refulgent rays of the sun will cause blindness by excessive stimulation, and in a lesser degree will a bright yellow glistening body produce a blind spot. In the mechanical side of dentistry it is necessary to fuse gold plate; this is done at a great expense of carbon, which when burning at high temperature produces a white light, but in reality an excess of the yellow rays exists. By watching this process twenty minutes or half an hour a blind spot would appear in each eye. The excessive stimulation of the retina produces the same condition as when looking at the sun or looking at molten iron. Men who follow these occupations become the early victims of cataract, proving that too much stimulation of the retina and ciliary muscle by these bright lights produces serious changes in the nutrition of the crystalline lens. All this work should be done only under the

protection of properly tinted glasses. A member of your society came under my care for gold-blindness. He had been experimenting with the fusing of metals, and for forty-eight hours after being thus engaged his vision would appear veiled, as if he were looking through a thin gauze,—evidently a slight retinitis from the overstimulation of the yellow rays. After proper adjustment of colored glasses he found relief. Glasses which correct hyperopia, or far-sightedness, in Philadelphia will not give comfort in Denver on account of the excess of yellow rays in the daylight; glasses must be changed to weaker ones, especially if high numbers are worn, and that little but overacting ciliary muscle must be given a rest.

The name "gold-blindness" I give to this defect because it follows working on yellow metals. Not only is the filling lost to vision, but also the contour of the cavity. The defect does not become manifest when working upon the white or amalgam filling; at least this trouble has not been mentioned by any one of my dental patients. I do not wish it to be understood that this defect is allied to color-blindness; it is not. The color-blind fails only to recognize color; he always sees shape and form. I assume, of course, that he has no visual defect. The other factors which enter as an exciting cause are, first, errors of refraction, electric or Welsbach lights, and excessive use of tobacco or alcohol.

The far-sighted individual with a certain degree of astigmatism becomes the first victim. The excessive amount of accommodation which a hyperope uses in looking at a close object without glasses is very great, and consequently the dioptric apparatus becomes very much irritated; tears form in the eyes, and vision becomes blurred through exhaustion of the muscle of accommodation. Then, again, to have both eyes converge at a given point it is absolutely necessary to have true muscle balance. If there should be exophoria—weakness of the internal muscle—one eye will wander out and binocular vision be lost, and in consequence the measuring distance will be interfered with; and it is unnecessary for me to mention that the blocking will be a failure. In point of fact, any muscle defect will bring on irritation, which sooner or later will cause gold-blindness.

The general condition of the patient may also be a causation of the disease. When the metabolism of the body is interfered with the muscular tone of all the active muscles is lowered, especially the muscles of the eyeball and the muscle of accommodation. Therefore tobacco and alcohol should be cut off, and such laws lived up to as will re-establish the tonicity of all the muscles. Great care should be exercised not to cause overaction in any form, for this sooner or later affects the retina. I firmly believe that the man or woman who leads a sedentary life should not be a meat-eater; he or she should live upon a diet that will eliminate the formation of uric acid. Many retinal troubles are caused by the uric acid diathesis. The dentist who is hard worked should be a water-drinker and a pedestrian. Drink water and take long walks should be his maxim. I know of no better way to preserve the health than to play golf; it is a game which makes a long walk interesting, and gives both arms and legs enough exercise without hardening the

muscles of the arms. As a layman I say a dental surgeon should encourage and maintain a gentle touch.

To those who are surrounded by blank walls, let their efforts be put forth in trying to decorate these walls with some colored pastoral scene. All can get a picture representing green fields, or a country lane with trees on either side, and I am sure none will regret doing so. Nothing gives the eye greater relief than a green disk or square of sufficient size suspended on a direct line of vision at or against the wall on which the eyes rest; but it is best of all if one can look through the window upon a green grass-plot or green trees. Whenever one can raise the eyes and look at long distances, he will be taking the strain off those little muscles which are so nicely adjusted and yet so easily injured; and, more than simply resting the muscles of accommodation, the retina will also be rested.

Always carry the head in the erect position, and, as it is exhausting to stand constantly, change the position as much as possible. Let him who bends forward see that the clothing is made loosely. Avoid tight neckwear, such as collars which are too small or shirt-bands or neckties tightly drawn; all these impede the flow of the downward column of blood toward the heart. Such retardation dams up the blood in the capillary bloodvessels of the head and eyes, and the heart driving against this column of blood with sledge-hammer blows is sure to cause dilatation of the vessels and the development of certain diseases or functional disturbances. Almost certain consequences are fullness of the head, headaches, or dizziness.

Pay special attention to the hygiene of the body, for that which tends to promote the general health acts beneficially upon the eye. Avoid the use of stimulants and drugs which affect the nervous system. Avoid reading when lying down, or when mentally and physically exhausted. See that no error of refraction exists; have the vision scientifically examined.

For years I have systematically prescribed a slightly colored glass of arundel or violet color. These glasses have been a boon to the gold-blind. Violet color modifies the excess of the yellow rays reflected from the gold, and makes a soothing glass for the retina. The pink or pale violet glass is the outgrowth of the chemist's art, and we can obtain any degree of color necessary for each individual case.

CORRESPONDENCE.

KOCH'S FOUR LAWS.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—Without criticizing the scientific work or discrediting the results claimed, I feel called upon to draw your attention to the article in the DENTAL COSMOS for November, 1900, on the "Bacteriological Study of Pyorrhea Alveolaris," by Dr. Geo. W. Cook.

In that article (page 1107) Dr. Cook quotes four laws which, from the context, are supposed to be Koch's laws in relation to diseases produced by bacteria. I have been unable to find such laws in any publication by Koch or his pupils. If such laws exist our bacteriology needs revising, and what we have been taught to consider the fundamental laws of Koch must be given up. Has not Dr. Cook confounded Koch's laws with something else? And will it not work an injury if they are permitted to stand unchallenged?

Yours very truly,

SAMUEL A. HOPKINS, M.D.

235 MARLBORO ST., BOSTON, MASS., January 14, 1900.

PROCEEDINGS OF SOCIETIES.

THIRD INTERNATIONAL DENTAL CONGRESS, PARIS.

(Continued from page 72.)

THIRD DAY—FRIDAY, AUGUST 10, 1900—*Continued.*

SECTION III. — OPERATIVE DENTISTRY AND SPECIAL THERAPEUTICS.

THE Section was called to order at 4.15 P.M. by its president, Dr. Richard-Chauvin.

Dr. CHARLES LEE, Paris, then read his paper (of which an abstract here follows) entitled

TWO CASES OF ULCERO-MEMBRANOUS GINGIVO-STOMATITIS IN ALBUMINURICS.

The observation of two cases of ulcero-membranous gingivostomatitis suggested to me the topic of the present communication.

I was surprised by the sudden appearance and severe manifestations of the gingivo-stomatitis, and the investigations that have been made on this disturbance have taught me much as to the nature of the buccal lesions that are likely to be observed in the course of chronic albuminuria.

Case I.—Mrs. T., dressmaker, fifty-four years of age, consulted us in August, 1899. She complained of pains in the buccal mucous membrane that became more severe during mastication. She attributed this condition of things to her teeth, which were in an unhealthy condition. We made an examination of the mouth, and discovered the presence of tartar, with many decayed teeth and infected pulps, roots, and teeth exposed from recession of the gums. The patient was wearing an upper plate of six teeth. Besides the unhealthy condition of the mouth, we also observed many ulcerations on the mucous membrane, on the gums, on the buccal surface of the lower lip, on the internal surface of the cheeks, on the sides of the tongue, on the palate, and on the gingivo-labial folds. These ulcerations had nearly the same general appearance; they were

superficial, of variable dimensions (from three millimeters to one centimeter); the bottom was of a yellowish-gray color; the margins were irregular. The ulcerations at the sides of the tongue and those on the internal surface corresponded to the position of decayed teeth and roots, while those on the palate were in the region of the four incisors, where the mucous membrane was inflamed in consequence of the irritation caused by the plate that the patient was wearing. The gingival ulcerations of the lower jaw were located on the free edges of the gums, and extended vertically. A deep red band, separated at certain points by little ulcerations, marked the seat of severe inflammation of the gingival mucous membrane.

The patient also presented local and general symptoms that perhaps are of sufficient importance to be described. The local symptoms were as follows: There was intense pain during mastication; salivation was abundant, thick, and sticky, especially in the mornings; the breath was very offensive; the gustatory sensibility had disappeared; the submaxillary glands were slightly inflamed and indurated. The general symptoms were not severe. She complained of headaches, loss of appetite, and slight gastro-intestinal troubles, with diarrhea. I discovered that she was an albuminuric, and was undergoing treatment for this affection as well as for hypertrophy of the heart.

Case II.—The second case had some symptoms analogous to Case I. We will only mention the special characteristics. Mrs. B., fifty-eight years of age, consulted us in June, 1898. The examination of the buccal cavity revealed the presence of four ulcers; two were located on the palate at the level of the left second molar, which was decayed, while the two others were on the lower jaw, upon the gums covering the left first molar and right lateral incisor, respectively. These ulcers were of dimensions varying from five millimeters to one centimeter. The bottom was of a dirty grayish color; the margins were irregular. The patient complained of acute pains. Salivation was abundant, but less than in Case I. The breath was very offensive. No particular general symptom was present. With the exception of the upper left second molar and the lower first molar of the same side, which were carious, all the teeth were in good condition. We observed the presence of a thick layer of tartar upon the lower incisors. This patient was also an albuminuric.

These two cases of ulcero-membranous gingivo-stomatitis in albuminurics suggested to us the idea of making some investigations on this very important question, but we did not find anything satisfactory in the literature of this subject so far published. The form of ulcero-membranous stomatitis described in the classical works is of a character similar to the two cases described. It is wrong to consider the form of ulcero-membranous stomatitis described by Dr. Bergeron as a specific infectious, contagious, and epidemic disease. We will explain this in the course of our communication.

In an article by Dr. Barrié, physician to the hospitals, we find the following statements: "Uremia can attack the upper portion of

the digestive organs, and may determine in the bucco-pharyngeal cavity special troubles, that we will designate under the name of uremic stomatitis." According to Dr. Barrié, there exist two forms of uremic stomatitis, (1) the *erythemo-pultaceous*, characterized by a thickening of the mucous membrane. The mucous membrane becomes dry, and is covered by a layer of a grayish and sticky substance. Under this layer the mucous membrane appears to be of a brilliant red color. (2) The *ulcerous* stomatitis, characterized by the presence of ulcerations upon the gums, cheeks, and lips. Dr. Barrié recognizes as the principal cause of uremic stomatitis the elimination of urinary poisons through the bucco-salivary glands. The substances eliminated in this way are urea, carbonate of ammonia, creatin, and xanthin. He looks upon the defective condition of the teeth and the chronic irritation caused by tobacco as predisposing causes. As a matter of fact, Dr. Barrié considers the uremic stomatitis as a toxic stomatitis, analogous to mercurial or plumbic stomatitis. He founds his opinion upon the etiology of stomatitis, and creates a variety that he calls *uremic stomatitis*.

The explanation that he thus gives us has the appearance of being a just and scientific one. Dr. Barrié, however, does not mention the rôle of the micro-organisms of the mouth in the uremic stomatitis. This omission seems to us to be a notable one, which cannot fail to modify very largely the conclusions deducible from his work.

In a recent and interesting work by Dr. Lebedinsky, entitled "Gingivo-Stomatitis and Buccal Polymicrobism," the author explains the intimate pathology of all forms of stomatitis. He protests against the numerous and various classifications of stomatitis, and only recognizes two varieties, the *specific gingivo-stomatitis* and the *septic polymicrobial gingivo-stomatitis*. This classification is believed to be a very good one, and it serves to strengthen our own assertions. The following is a quotation from Dr. Lebedinsky's book: "We are of the opinion that only two varieties of stomatitis exist, the specific gingivo-stomatitis and the septic gingivo-stomatitis. We name specific gingivo-stomatitis an affection of the buccal mucous membrane that is only the manifestation of a general disease, and that has the same specific pathogenic agent as the general disease from which it originates. Syphilis, tuberculosis, diphtheria, and aphthous fever can be the cause of manifestations in the buccal mucous membrane. Hence we have syphilitic gingivo-stomatitis, and likewise the diphtheritic, tuberculous, and aphthous. The specific forms of gingivo-stomatitis are as numerous as the specific diseases from which they originate. We understand by septic gingivo-stomatitis all the primary or secondary infections of the buccal mucous membrane that are caused by the buccal polymicrobism. Fevers, diabetes, Bright's disease, pregnancy, traumatism, tartar, mercury, bismuth, potassium bromid, and other metallic salts only produce a septic gingivo-stomatitis, which is caused by the buccal polymicrobism."

Dr. Lebedinsky then explains why so many classifications of gingivo-stomatitis have been made. The persons who made this

classification considered in the etiology the occasional causes, creating, for instance, the stomatitis of pregnant women, that of diabetics, that of albuminurics, the mercurial, the plumbic, the bromo-potassic, that due to bismuth, and many other forms. Others considered the evolution of the inflammation, and created the erythematous, the erythematous-pultaceous, the ulcerous, the ulcero-membranous, and the gangrenous varieties. It is only the same polymicrobic septic stomatitis considered at the different stages of its evolution. The ulcerous stomatitis does not begin at once by ulcers; it comes after the erythematous stomatitis. This condition takes place when the cause persists, on account of a lack of proper treatment. The gangrenous stomatitis, again, is the consequence of ulcerous stomatitis.

Dr. Lebedinsky is right in considering the buccal polymicrobism as having the principal rôle in the production of septic gingivo-stomatitis. He says: "It matters very little that the gingivo-stomatitis should be due to lead, mercury, potassium bromid, or nitrate of silver. It makes no difference whether the stomatitis be due to fatigue, diabetes, traumatism, or whether it be due to measles, to a developing state, to scarlet fever, or to the eruption of the wisdom-tooth. All these agents produce the same result; they prepare a favorable habitat for the numerous micro-organisms of the mouth by weakening the mucous membrane. The microbic action in such cases does not find the normal antagonism of the buccal tissues. Infection is established, and gingivo-septic stomatitis sets in."

Dr. Lebedinsky recognizes, as we do, only two varieties of gingivo-stomatitis. One is the specific variety, and is due to a specific pathogenic microbe; and the other is the septic variety, which is due to the pathogenic action of the buccal polymicrobism. The rôle of the teeth in septic stomatitis has been carefully studied by Dr. Lebedinsky. The septic stomatitis always begins at the region of decayed teeth and roots, at the point where a *locus minoris resistentiæ* is established.

According to this same investigator septic stomatitis has general, local, and mixed causes. Among the most important *local causes* we find the eruption of the wisdom-tooth and of the first molar, that he very wisely calls the "wisdom-tooth of children." He considers among the *general causes* all the infectious diseases which are the cause of secondary infection, and of disturbance due to a condition of decreased nutrition, as in diabetes, albuminuria, etc.; and as *mixed causes* the mercurial, plumbic, and arsenical poisoning. This work, which confirms our own observations, is a very interesting one.

Dr. Cruet, in his work on the "Hygiene and Therapeutics of the Diseases of the Teeth," speaks of the rôle of buccal polymicrobism; also Dr. Tellier, in his communication presented to the National Dental Congress, commends this classification, which he finds to be a nearly exact one. It is regrettable that the specific form of stomatitis should not have been recognized by Dr. Tellier, for it is impossible to deny its existence; and from the foregoing quotations,

and also from the investigations that we have carried on, we conclude that it is impossible to dispute its presence.

From the rapid summary of our investigations on the topic of ulcero-membranous gingivo-stomatitis we reach the following conclusion: That uremic stomatitis, as well as the stomatitis of diabetics, of pregnant women, and many others, are manifestations of a septic stomatitis that has as its sole agent the buccal polymicrobism.

The two patients that we have referred to at the beginning of this article were albuminurics. Albuminuria weakens the economy and disturbs equilibrium. The whole organism, and the oral cavity in particular, is in a condition of morbid receptivity, and the infection spreads over the weakest area. In these two patients the weakest area was the oral cavity, on account of the bad condition of the teeth.

In order to make a *résumé* of our work we will say:

1. The ulcero-membranous stomatitis of albuminurics is a septic polymicrobic stomatitis, which we classify as belonging to the septic variety of Dr. Lebedinsky.

2. This stomatitis may go through different stages. It may be erythematous, ulcero-membranous, and even gangrenous.

3. The stomatitis of albuminurics begins nearly always at the region of decayed teeth and of infected roots.

4. Albuminurics could certainly avoid the stomatitis if the mouth were kept in a good hygienic condition.

Discussion.

Dr. LEBEDINSKY. The communication that we have just heard is interesting from a double standpoint,—from that of classification and from that of the relations of the buccal lesions with general pathology. There are many diseases which produce buccal lesions, and these lesions have been designated according to the name of the diseases that have produced them. Therefore we find in different books the classification of diabetic stomatitis, the stomatitis of pregnant women, the mercurial, and all the other varieties. They designate these different disturbances by adding the name of the general disease or drug which is supposed to be the cause of the buccal lesion. The different authors have looked at the occasional etiology. Hence when a patient presents himself at our office for treatment of a marked redness of the mucous membrane, we prescribe the appropriate treatment, calling the disturbance an erythematous stomatitis. If the disease progresses the stomatitis becomes of the pultaceous variety; later on it may become of the ulcerous, or even of the gangrenous, variety. The practitioners are giving different names to the different stages in the evolution of the same disturbance. If the patient happens to see a physician, and if this practitioner discovers that the patient has undergone mercurial treatment, he will change the diagnosis and will call it mercurial stomatitis. It is certain that there is no excuse for this kind of classification; it merely designates the disturbance according to its etiology or to the different periods of its pathological evolution.

If I insist on this subject it is because of the important rôle of buccal pathology in general medicine from the standpoint of the relations of the buccal lesions with the entire organism. We know that this variety of buccal lesions may result in the formation of abscesses, osteitis, necrosis, or phlegmons at remote regions. There is stomatitis due to disturbances of the lymphatic system; also a variety due to nervous disturbances, as in the case of intercranial phlebitis. In a paper that I read recently before one of the medical societies I tried to classify in a systematic way all the buccal lesions. In my paper I discussed the contents of the buccal cavity, also its biological equilibrium. When I say the buccal contents I mean all the secretions present in the mouth,—mixed saliva, which is a mixture of different salivas; of secretions of the buccal mucous membrane; the lymphatic glands, and the micro-organisms of the mouth. The relations between these different elements should be studied, for they have mutually antagonistic relations. We know that the saliva has a definite action. Some attribute to this secretion a bactericidal property; others a mechanical one, and, lastly, it has been shown that saliva possesses the property of attracting leucocytes, which defend the buccal cavity against micro-organisms.

The classification of micro-organisms into pathogenic and non-pathogenic is altogether wrong. All species of micro-organisms have some noxious action on the organism. When harmony does not exist between the microbic action produced in the buccal cavity and the reaction of the leucocytes found in the saliva, biological equilibrium does not exist, and it is this condition of things that I call the neutralization of the microbic action by the lymphatic system and the saliva. Under normal conditions a biological equilibrium exists in the buccal cavity, and this biological equilibrium is in direct relation with the equilibrium of our organism. If our health is perfect it is certain that the conditions of the buccal cavity will also be healthy, but if the equilibrium of our organism is disturbed it is evident that the equilibrium of the mouth will also be disturbed; and once this condition sets in the micro-organisms which inhabit this region will put their virulence in evidence.

The classification which I made three years ago seems to me to be one of evident importance, because it divides the forms of stomatitis into two groups: First, the specific stomatitis, which is an infection of the buccal cavity due to specific micro-organisms, such as the bacillus of tuberculosis, of syphilis, or of aphthous fever.

We must explain under what circumstances it is that a general disease, such as diabetes or albuminuria, produces buccal lesions. I have already spoken about the general equilibrium. This equilibrium is destroyed with the presence of any specific disease. In the case of Bright's disease the functions of the kidneys are imperfectly performed, and, as a compensation must occur, it happens that other glands undertake the task of the disturbed organs. It is for this reason that the salivary and sweat glands eliminate the waste products that the kidneys fail to take away.

How is the equilibrium destroyed? We see at once that the mouth is not in the normal condition; it contains something that

should not be there,—urea, ammonia, or some other toxic substance. These substances injuriously modify the chemical nature of the salivary fluid; also that of the lymphatic system. These changes are the cause of a diminution in the number of leucocytes, and a weakening of the cells engaged in the struggle against the microbic action. There is one thing certain, and that is that the disease has broken the biological equilibrium of the buccal cavity, and when once this condition takes place the microbes act and produce the infection, the gingivo-stomatitis, which, according to the pathological evolution, will be erythematous, ulcerous, ulceromembranous, and even gangrenous.

Dr. GROSS. The paper by Dr. Lee is extremely interesting, and the explanations of Dr. Lebedinsky are very accurate. I will say that two kinds of stomatitis exist,—the specific and the infectious. The infectious stomatitis occurs in cases of syphilis, tuberculosis, diphtheria, and aphthous fever. I believe that Dr. Lee has been a little hasty in stating that we have to deal with an albuminuric stomatitis. Dr. Lee has described two cases. From a general standpoint, it is certain that the organism is in a condition of lessened resistance, but I believe that we should also consider the local conditions, for if we examine the first case of Dr. Lee's we shall see that he records also the presence of roots and of teeth exposed from recession of the gums. These factors are enough to cause ulcerations, especially in cardiac or albuminuric patients, because of the unhealthy state of their organisms. Hence very little influence, from a local point of view, may be sufficient to produce one or several ulcers, which may be the beginning of a general infection.

With regard to his second case, we have no local factors, but the patient is a uremic one, whose general health is not good; therefore buccal infection will take place with greater facility than in any other patient; nevertheless, I believe that we ought not to classify the disturbance as being one of the albuminuric variety, for we should take into account the local conditions. Probably the patient's mouth is in bad condition, and, as she was an old person, some roots were probably present in the mouth, and we cannot say if the disturbance would not have taken place in a healthy individual. The paper by Dr. Lee is otherwise a very interesting one.

The PRESIDENT. In the last paper and in the remarks by Dr. Lebedinsky references are made to gingivo-stomatitis. I would like to see a differentiation made between the stomatitis observed by Drs. Lebedinsky, Gross, and Lee. Are they all true gingivitis? It is correct to designate inflammations of the tissues of the mouth as stomatitis, but you must differentiate them when you speak of the origin of those diseases. The author of the paper speaks of gingivo-stomatitis. He also mentioned true gingivitis caused by albuminuric influence, the specific gingivitis, etc. Very often the gingivitis is localized in ulcer over two or three points, and if these ulcerated points were not discovered by the dentist or pointed out by the patient they probably would not be seen while simply looking at the mouth. When the mouth is a clean one we would not believe that gingivo-stomatitis could be present, but we

do find some cases like that. The ulcerations can be of different forms, and in this respect I agree with Dr. Lebedinsky. I do not follow the actual pathological etiology, because I find it very defective from the standpoint of classification. The etiological classification is of considerable importance. In the communication that was just read tartar was the causal factor of the stomatitis.

I wrote a paper in which I denied in an absolute way the existence of stomatitis of pregnant women,—also other varieties, but especially the last mentioned. During many years I had the opportunity to examine the mouths of women during the first gestation. During this period eight cases of gingivitis were cured. Dr. Charpentier, who is a demonstrator in the Ecole Dentaire, is treating in a systematic way the pregnant women of the Maternité who are suffering from gingivo-stomatitis, and he is convinced that the local causes play a rôle in the production of the disease. The state of these women is favorable for the production of stomatitis, but the local conditions are also part of the cause of this disturbance, which is present in the latent state. Tartar is present, and this causes a recession of the gums. We see hundreds of cases of gingivitis in persons where no general symptoms existed. They visit the dentist to have another disturbance treated, and sometimes they will not even mention the affection of the mucous membrane. You remove the deposits present, and immediately afterward the gingivitis is cured.

I would like to hear an explanation of the toxic etiology of the lesions referred to in Dr. Lebedinsky's paper. In the lesions that I have reference to you will find a disturbance which is so slight that the attention of the patient is not attracted to it, but which occurs with more frequency than those that you have mentioned.

I think that Dr. Lee ought to have told us if any of the teeth of those albuminuric patients were loose; also the condition of the alveolar membrane, and of the ligament of the teeth. I believe that it would have been interesting to add those observations.

[The next paper was one by Dr. Poutrain. This paper, with the discussion upon it, will be published in the March issue of the DENTAL COSMOS.]

Dr. E. TOUVET-FANTON then read his article (of which an abstract follows) entitled

FILLING CAVITIES BY MEANS OF ADJUSTABLE BLOCKS OF ARTIFICIAL ENAMEL.

The object of this method is to popularize and simplify the esthetic method of filling by means of blocks of porcelain or enamel; to do away with the use of the special furnace, and to economize the time and work required for the making of special inlays for every case. If we have on hand a few blocks easily adjustable to the cases which present themselves with greater frequency, and which are not of a very variable form, we shall be able to use in bicuspid and incisors the easy method used in the case of occlusal cavities in molars, which we fill with blocks made from the enamel rods that are for sale in the various depots.

The cases especially appropriate for the satisfactory insertion of adjustable blocks are those found in the bicuspid, because there the filling requires not only esthetic and resistant qualities, but also because of the easy way of inserting them on account of the little variation in the form of cavities of this kind. The adjustable blocks are useful for the contouring of approximal cavities in bicuspid. Cavities of this kind are nearly always of the same form, and can be easily shaped to a uniform type.

The blocks are made from a piece of artificial enamel, prepared with the paste used for the manufacture of artificial teeth. The block follows the outlines of the lateral wall of a bicuspid. It has a groove cut at the masticating surface, in order that it may correspond with that of the natural tooth. The blocks have hollow sides, like a Logan crown, but with finer edges, so as to make it easier to grind them when adjusting. At the inner surface of the block there is a projection that gives to the piece the appearance of a shirt button. It is made in such a way that the piece will have a retentive shape, even when adjusted to shallow cavities. The inner face of the inlay is roughened, in order that it may adhere strongly to the cement.

This variety of inlays can be placed wherever blocks of natural or artificial enamel would be indicated. The adjustable blocks are to be preferred to the inlays made specially for every case, for these last require for their manufacture a great expenditure of time, and, in addition, they require to be ground in order to be properly adjusted; also their retentive features are not so strong, no pains being taken to give a special retentive form. If such pains were taken, then still more time would be demanded. The adjustable block, on the contrary, can be placed advantageously without much loss of time. This system may be useful to those practitioners who do not possess the appliances required for the making of inlays according to the impression of the cavity.

The adjustable blocks can be placed in incisors and cuspids, but in these teeth they are not so solid and precise as in the bicuspid. (No discussion followed the reading of this paper.)

The president then called on Dr. BOUCHACOURT to read his article (of which an abstract follows) entitled

THE ADVANTAGES OF UNIPOLAR EXCITATION OF CROOKES TUBES IN THE APPLICATION OF ROENTGEN RAYS TO STOMATOLOGY.

This method constitutes a most marked stage of progress in electrical science. The patient and operator are by this method free from injurious electrical influence, while the manipulation of the appliances is easy. The patient does not become frightened when he sees the working of the Crookes tube, for it looks as though the operator was holding an Edison lamp in his hand.

The manupolar generator of induction, the special tubes (endodiascope and others), the rational fluoroscopes (manudiascopes), compose the complete outfit. And this will furnish the practitioner with all that he needs in order to use the Roentgen rays to the best advantage.

Practice alone will teach one to determine the best position to be given to the Crookes tube and to the receptive surface in order to obtain the best image of the part to be studied (roots, fractures, foreign bodies, etc.).

Judging from the anatomy of the maxillary bones, it can be affirmed that to examine roots the receptive surface must be placed against the peripheral face of those bones where the roots to be examined form impressions on the external surface. This examination can be effected through the cheeks and lips, but to obtain precise details the receptive surface must be placed between the peripheral surface of the maxilla and the soft tissues covering it. The soft tissue also aids in insuring immobility of the sensitive surface.

Discussion.

Dr. GROSS. I have studied a little the question of dental radiography. I have already stated to Dr. Bouchacourt the objections that I have to his method, and will not repeat them here because Dr. Bouchacourt will give us a demonstration on Monday. I have friends who make radiography their special occupation. They affirm that with the use of the screen nothing could be seen, and I have convinced myself of this fact. In fact, the view of small objects is more confusing than with the radiograph. The patients also prefer the radiograph.

With regard to the examination of the relation of roots of several teeth, as in the case of regulating operations, the screen will have to be placed at a certain distance, and the deformity may appear more considerable than it really is. I will attend his demonstration, and then I will be surer as to the advantages of his method.

Dr. BOUCHACOURT. The first objection of Dr. Gross refers to one of the great questions on Roentgen rays. Dr. Beckler, a physician of the hospitals, uses the screen more and more, and it must be borne in mind that a screen examination can be repeated as often as desired. If, for instance, you want to examine a tooth in the upper jaw, if the film is used it will have to be placed at the same point, but if you place Crookes tubes very far you will not have any deformity produced, because the root is farther from the plate than from the center of the tooth. If, on the contrary, you wish to use the radiograph, it is certain that the root will be nearer to the external surface than to the internal. I have made several radiographs which are not good. I introduced a little plate of four square millimeters in the mouth between the cheek and the gum. This is a very simple way of placing the plate. There is some enlargement, but parallelism is established between the surfaces of the tooth and of the plate.

Dr. GROSS. It is because in such a case your film is applied on the tooth, but if you want to place your intra-buccal tube you will have considerable changing.

Dr. BOUCHACOURT. When introduced in the mouth it is kept in an immovable position by the simple contraction of the tissues.

Dr. GROSS. This is possible when the gingivo-buccal fold is at the level of or higher than the extreme point of the root, but when

it does not reach the point of the root the film has to be an extra-buccal one.

Dr. BOUCHACOURT. Can we not press the fold upward?

Dr. GROSS. No; because it is always necessary to see the point of the root.

Dr. BOUCHACOURT. Another advantage of this method is that the tube can also be placed behind the maxilla, and in this way I have made radiographs of a large portion of the lower jaw.

There is another feature that I wish to point out, and that is the safety of this method. At first I was told that I would burn and depilate my patients, and that my method would be the cause of disastrous results; but during the two years and a half that I have been using this method I have never had any accidents.

SECTION IV.—GENERAL AND LOCAL ANESTHESIA.

The Section was called to order at 4.15 P.M. by its president, Dr. Ronnet, who called on Dr. A. BLEICHSTEINER, of Gratz, to read his article (of which an abstract follows) entitled

COCAIN INJECTIONS AS A MEANS OF SECURING LOCAL ANESTHESIA.

For the painless extraction of teeth the essayist had been using since 1886 injections of cocain hydrochlorid, etc. The unfavorable criticisms that have been published lately on the subject of cocain have induced him to discuss its use once more, inasmuch as he can only express a very favorable opinion upon the effects of this drug. He had previously discussed this question before the International Dental Congress of Paris in 1880, and that of Chicago in 1893.

The author bases his observations on fifty thousand injections that he has made. He uses generally the contents of a syringeful of a solution at five, three, or two per cent. He discussed briefly the following points:

1. The preparation used.
2. The solution.
3. The syringe (his own device).
4. The method of injection.
5. His observations on poisoning and other unfortunate cases.

He had always used the solution prepared by E. Merck, Darmstadt. Since 1894 he had used only a two per cent. solution; not because he had had cases of poisoning with a three per cent. solution, but because as good results are obtained therewith. The cocain hydrochlorid is dissolved in distilled water, to which one part of mercury bichlorid for every 10,000 parts is added. Two decigrams of cocain hydrochlorid are mixed with ten grams of this solution, and this preparation is kept in suitable bottles. These solutions keep very well for weeks, and the results are very satisfactory.

The syringe used is composed of a glass cylinder mounted on vulcanized rubber, and has never changed. The canula has the shape of an S, made in such a way that the prolongation of the axis of the glass cylinder and the end of the canula make an angle of twenty to thirty-five degrees. The bar of the piston is gradu-

ated, and every space represents a drop or a decigram. The needles are only 20 mm. in length. The cutting part of the needle is at the utmost 2 mm. in length. The syringe also has two bars which serve as a fulcrum to the fingers. After every injection the syringe and the needle are placed in a bottle of absolute alcohol and hermetically sealed. In this way one may be absolutely sure that the syringe is completely sterile.

The method of injection is as follows: The gum-tissue covering the tooth to be extracted is thoroughly cleaned, and all the salivary secretion present is removed by means of a piece of cotton saturated with absolute alcohol. Immediately after making the injection he begins at the interstitial portion of the labial or buccal gums, at the point nearest the center of the tooth. The first injection is made horizontally, or, if possible, parallel to the gingival margin. The needle is passed into the tissues as deeply as possible. The second injection is made horizontally toward the distal surface of the neighboring tooth. The third injection is made mesio-lingually; the fourth disto-lingually. The most important point is to make the four injections as near to the gingival margin and as parallel as possible. After making the four horizontal punctures, four vertical ones are made, and these also serve to show whether sensibility has disappeared. The injection in each puncture consists of a drop only, to avoid the swallowing of part of the solution; also the patient is directed to use a solution for rinsing the mouth. There is no danger in swallowing a minute amount of the solution, but so doing anesthetizes the uvula, and the patient has the sensation of having a foreign body in the narrow portion of the pharynx, a thing which causes much annoyance and induces expectoration until the tissue returns to the normal condition through the use of gargles of cold water.

During the injection it must be carefully observed by means of the mirror that the solution does not escape. If this should happen the injection will need to be performed in a different direction. If the gums become blanched the anesthesia is successful; the contrary is the case if, instead of blanching of the gums, several swollen spots are observed. The injecting liquid should be forced between the periosteum and the bony structure of the alveolus; in this way the liquid penetrates the medullary spaces of the bone until it reaches the alveolo-dental membrane. It is only under these conditions that perfect anesthesia is secured. The puncture should be parallel to the curve of the alveolar process, so as not to penetrate very deeply into the bone nor too superficially into the epithelial tissue. This is a difficulty that has to be overcome, and the skill necessary to do this is acquired only after long practice.

It is the practice of the essayist to extract the tooth immediately after the last puncture is made, and not to wait for the effects to become more marked,—a condition which other practitioners seem to consider necessary. He believes that if the injection has been well made the anesthesia cannot become more pronounced in the space of time elapsing between the injection and the extraction, but, on the contrary, the danger of a wider dispersion of the solution be-

comes greater. If the extraction is made immediately after, part of the solution injected comes out with the blood which flows out after the extraction. He is sure that by his plan poisoning, which otherwise does occur, is prevented; observation and practice only tending to confirm his views.

He has not observed the slightest trace of poisoning since adopting the use of two per cent. solutions; dilatations of the pupil, dryness of the throat and of the nasal mucous membrane, vomiting, vertigo, tinnitus aurium, diminution of the pulse-rate, or even complete disappearance of the pulse; cold perspiration on the forehead, hands, and sometimes over the whole body; shaking, tetanus, tonic spasm, apathy, soporific condition, unconsciousness, lethargy, loss of strength, collapse,—all these symptoms have not been observed since he began using the three per cent. solution, and with greater reason are they absent now that he only uses a two per cent. solution. But in very nervous and anemic persons he has observed paleness of the face and a more or less marked weakness due to the atonic condition of the vessels. These cases also have now disappeared. His precaution with such patients consists in giving them a small glass of brandy before the injection, and then to wait until its effects are produced; if necessary a second glass is given. The results of this plan have always been satisfactory.

Conclusions.—There is not another method of producing local anesthesia that can equal the method of injecting cocain hydrochlorid.

2. A two per cent. solution is sufficient; even a one per cent. solution would suffice.

3. The maximum dose of cocain hydrochlorid for one injection is five centigrams.

4. The extraction should be made immediately after the injection.

5. A stimulant (brandy) should be given before the injection to anxious, nervous, or anemic persons.

Discussion.

Dr. CORREVON. It seems to me that a dose of five centigrams is an exaggerated quantity. I believe that two or three centigrams is a maximum dose.

Dr. BLEICHSTEINER. If the patient is not in a state of anxiety four or five centigrams can be injected. Many times I have made six, seven, or eight injections without any bad effects.

Dr. JEAY. We are extremely happy that you should have made this communication. You have confirmed, by your great practice, the ideas of Dr. Réclus, our authority on cocain. We have followed in the Ecole Dentaire the technique of Dr. Réclus, which is similar to yours, and which I followed this morning on three or four patients. Nevertheless, I will ask two or three little questions. We use one per cent. solutions, and we claim that the more diluted the drug is the less is the danger of intoxication; and that if we take the precaution to wait some time between the injection and the beginning of the operation the injections of one per cent. solu-

tion are the most rational ones. The one per cent. solution has also the advantage of covering a larger field of operation, and is especially useful when several extractions have to be practiced. If I understood correctly, your syringe is made of vulcanized rubber. I would like to know how you sterilize it.

Dr. BLEICHSTEINER. I put it in absolute alcohol.

Dr. JEAY. Is sterilization sufficiently accomplished in this way?

Dr. BLEICHSTEINER. I believe so.

Dr. JEAY. How long do you leave the body of the syringe in absolute alcohol?

Dr. BLEICHSTEINER. Until I need it to make another injection.

Dr. JEAY. And if another patient comes right after that?

Dr. BLEICHSTEINER. I use the syringe.

Dr. JEAY. How do you sterilize the needles?

Dr. BLEICHSTEINER. In the same way.

Dr. JEAY. My personal opinion is that the best syringes are those which are made of a material which can be boiled; those made of metal, with disks made from the pulp of the elder tree (*Sambucus Canadensis*), or from coir (cocoanut fiber), or from any substance that can be boiled. In the Ecole Dentaire we use boiling water to which some bicarbonate of sodium is added to prevent the instruments from becoming rusty.

Dr. BLEICHSTEINER. You do that because your syringe is made of metal, but when it is mounted in rubber it is not possible to do so.

Dr. JEAY. Do you consider absolute alcohol as a sufficient medium of sterilization?

Dr. BLEICHSTEINER. Certainly. If you immerse the point of the syringe in absolute alcohol it is impossible that infection should take place, because there is nothing in the syringe but the liquid used for the injection.

Dr. JEAY. I have had two cases of cocainism with one per cent. solution, hence we must not say that the use of this percentage solution is devoid of all danger. The phenomena consisted in a feeling of nausea and in an impossibility to keep the upright position. This lasted five or six hours. Besides, we also recommend our students to follow Réclus' ideas, and to practice the injection while the patient remains in a horizontal position.

Dr. BLUMENTHAL. The essayist has told us that he prepares in advance ten or twenty grams of cocain solution. I believe that solutions prepared in advance decompose.

Dr. BLEICHSTEINER. The bichlorid of mercury prevents decomposition.

Dr. BLUMENTHAL. The cocain solution may change from contact with the air, and whenever I have injections to make I obtain good results by preparing only the quantity necessary for one injection.

Dr. BLEICHSTEINER. I make a solution of ten grams of cocain that I use as long as it lasts. I have used solutions that were three months old.

The PRESIDENT. We must thank Dr. Bleichsteiner for his ex-

tremely interesting communication, the writing of which has demanded so much work and gives the results of such long experience.

Discussion closed.

The next number on the program was an article by Drs. JULIEN and CAMILLE TELLIER (of which an abstract follows) entitled

A CONTRIBUTION TO THE STUDY OF ANESTHESIA FOR OPERATIONS
UPON THE TEETH.

Many pages have been written on anesthesia for the extraction of teeth, nevertheless this question has as yet not been settled. Some practice general anesthesia, others reject it in an absolute way. Among those who share this opinion some induce insensibility by the use of refrigerating agents, and others by the use of analgesic drugs injected into the tissues; and each one recommends more or less exclusively the practice which seems to give him the best results.

In this paper we will not discuss the general features of the different anesthetics, their physiological action, or the advantages which they present from an absolute point of view, or as compared with another agent.

The methods of general and local anesthesia are relatively numerous. It is difficult to have the same amount of experience with every one of these different methods, based on the observation of an equal number of cases. We must also take into account that statistics on anesthesia should describe thousands of cases in order to be of value. This holds good for the agents used in general anesthesia, as well as for those used in local anesthesia. When a certain anesthetic has produced good results in fifty, one hundred, or even five hundred cases, the objection can always be raised that the operator has had to deal with a specially favorable series, and does not demonstrate exclusively that the result will be the same in the next series. It is necessary that experience should embrace a great number of cases, and it is practically impossible for one practitioner alone to possess it. In fact, individual convictions are not always the direct scientific consequences of observation, but often are the impressions derived from lectures and sometimes from the surroundings in which the surgical education was received.

In this contribution we will make an *exposé* of our method of inducing anesthesia for the extraction of teeth, insisting upon the advantages of general anesthesia induced by means of ether. We will discuss the peculiarities of this agent when used for dental operations, also its peculiar advantages.

To suppress the pain which accompanies the extraction of teeth we possess two methods,—local anesthesia and general anesthesia. The first is induced by a group of agents, consisting of drugs which are applied against the gums (ether, methyl chlorid, ethyl chlorid, alone or combined) or injected into the soft tissues of the gingivodental region (cocain, eucain, guaiacol, tropacocain, acocin, nervanin, etc., method of Schleich). The agents of general anesthesia usually employed are ether, chloroform, ethyl bromid, hyponitrous oxid,

ethyl chlorid, ethylene chlorid, hypnone, and the mixed methods. We use exclusively ethyl chlorid and the method of Schleich to produce local anesthesia, and hyponitrous oxid and ether for general anesthesia.

The hypo-gingival injections of cocain very often produce very satisfactory results, nevertheless we never have recourse to them, because we do not believe that they are entirely safe. On several occasions we have witnessed accidents following injections of cocain that had been made according to the rules laid down by Réclus. Once the syncope lasted three hours, and was of a very serious character. One of us had two cubic centimeters of the solution used by Réclus injected into the tissues of the neck for the removal of a small sebaceous cyst. No pain accompanied the operation except toward the end, when painful symptoms of depression and excitation took place. The precautions that have to be taken before the operation (condition of the heart) and after the operation (necessity of keeping the horizontal position during several hours), even after a single extraction, and lastly the possibility of obtaining as good results with other methods of injection, have induced us to reject completely the use of this agent as practiced ordinarily.

After having experimented in our services of dental consultation in the Charité Hospital and in the Hospice de l'Antiquaille, we decided to use the Schleich infiltration method. This method does not offer the objections raised against the other methods of using cocain except those that can be raised against every method of injection, and which are: impossibility of practicing the injection in the region of the third molar, also in case of trismus, and when periostitis with extreme tension of the tissues exists. We used this method only when local anesthesia was indicated.

The only refrigerating agent that we use is ethyl chlorid, which possesses some advantages and some disadvantages. Among its advantages its absolute safety and the rapidity with which it is applied make it sometimes a valuable auxiliary. Its use may be painful in cases of periodontitis and when caries exists in the neighboring teeth; this notwithstanding the precautions used to prevent this inconvenience. The effects should not be exaggerated, and, above all, should not be constant. Sometimes it produces an absolute analgesia; sometimes it only diminishes the painful sensation, and sometimes its action is of no consequence. We will not speak of those cases in which its use is altogether contraindicated, and where it produces painful results. In certain difficult cases it has given perfect results.

We will now describe a case in which we used a *modus operandi* which we will point out, although it may be that it is not altogether new. A lady thirty-eight years of age presented herself to us for the extraction of a root of an upper incisor which was altogether covered by gum-tissue. She demanded to be anesthetized. We proposed to use local anesthesia, but she refused. We examined the general condition of her system, and discovered a mitral constriction. As a consequence of this abnormality we refused emphatically to administer a general anesthetic. The patient then

consented to be operated on under the influence of a local anesthetic. One of us directed a stream of ethyl chlorid over the region of the incisor during the entire operation of exposing the root from its gum covering and during the extraction. The patient did not feel anything during either the incisions or the extraction.

Very often we operate in this way in the anterior gingivo-dental region. Once we produced general anesthesia by following this method. It is needless to say that one should avoid this, especially when the precautions that should precede a condition of general anesthesia have not been taken.

When local anesthesia is contraindicated, or when it cannot be used because of the patient's demand for a general anesthetic, we use either hyponitrous oxid for short operations, or ether when several and difficult extractions have to be performed. Hyponitrous oxid is used by nearly all the dentists who accept the principle of general anesthesia. It must be remembered that not every dentist accepts the practice of general anesthesia, for many practitioners have gone as far as to demand in a professional society to vote for the suppression of general anesthesia for the extraction of teeth. Hyponitrous oxid is very convenient for short operations, as, for example, the extraction of one or several teeth and roots. Six has been the maximum number of roots that we have been able to extract under the influence of this anesthetic. We administer hyponitrous oxid in combination with oxygen. For indications, contraindications, *modus operandi*, etc., we refer to Dr. F. W. Hewitt's book, which is a good and an easily understood one, even by those who are not very familiar with the English language. The principal advantages of hyponitrous oxid are the rapidity with which it produces insensibility and its safety, which is as great as could be desired. If we read attentively the records of cases of accident following its use we will see that they are very few, especially when compared with the great number of administrations that have been made up to date, and that they were produced because the gas was administered under unfavorable conditions or because the contraindications were not taken into account; and in some cases we observe some extraordinary coincidences. We consider that the contraindications against the administration of hyponitrous oxid are the same as for ether.

In London, Berlin, and in many other cities we have seen very often that hyponitrous oxid is administered without a previous examination of the patient, and without inquiring if the stomach is empty or when the last meal was taken. We must declare that we never witnessed an accident, but we must insist upon this point, because if fatal results follow the administration of hyponitrous oxid under such conditions we are sure that they would not have taken place if the necessary and intelligent precautions had been taken.

We never give hyponitrous oxid without examining the heart and lungs of the patient, and questioning him or her as to any previous disease. The patient must have an empty stomach, or at least three or four hours must have elapsed from the time of the

last meal. We do not permit the patient to have any tight clothing, and in the case of a woman the corsets have to be taken off and the skirts loosened. It will be said probably that these are elementary precautions, but we know from experience that very often they are neglected, and we protest energetically against this method of action. The anesthetic must be administered under the best possible conditions, and we have never seen any accident follow hypnitrous oxid anesthesia when this agent is given with the necessary care and precaution.

The disadvantages of hypnitrous oxid are: First, an exciting period in nervous persons, which is rarely very strong; sometimes it becomes stronger after the administration. Certain women have attacks of hysterical character, generally of short duration. Second, cyanosis of the face, indicating that oxygen has not been combined with the gas in sufficient quantity. The cyanosis disappears very quickly in nearly every case. Lastly, the short duration of the insensibility and in certain cases the reappearance of sensation before the operation is over, especially when the extraction is of a difficult nature. Some writers advise that in such cases a new administration should be started, but we are against this practice because blood may enter into the respiratory tract. We prefer to postpone the operation.

The only accident that we have observed has been luxation of the lower jaw, and, as a matter of fact, it was not due to hypnitrous oxid gas, although the condition takes place with greater frequency when this agent is administered, because from the beginning it is necessary to keep the mouth open by means of an appropriate mouth-prop. If serious accidents of asphyxia follow the administration, they should be treated the same as in the case of ether anesthesia.

For operations of long duration we use ether. After some experience we have given up the use of bromid of ethyl, and also of chloroform in connection with dental operations. With some precautions it is possible to administer ether with nearly absolute safety. The same is not the case with chloroform. Every surgeon knows the sudden syncope that takes place at the beginning of the administration of chloroform, against which every effort is powerless. We believe that the probability of such a condition taking place should be a strong enough reason for rejecting chloroform from the practice of dentistry, and if ether could cause an accident of this kind we could understand why dentists entertain such prejudices against the agent; but we know it does not.

The accidents liable to occur in the use of chloroform may become manifest at three periods of the anesthesia:

First. At the beginning, after a few inhalations have been made, a sudden arrest of the heart-beat and of the respiratory movements take place. These phenomena are accompanied by paleness (white asphyxia). It is, in fact, a syncope excessively serious, one whose pathogenesis we will not describe. This accident is nearly always mortal, and is above our therapeutic resources.

Second. At a more advanced period, after inhalation of a more

or less considerable quantity of the anesthetizing agent, the asphyxia is accompanied by a violet coloration of the face, and is very soon followed by an arrest of the heart's action if energetic measures are not taken immediately after its appearance. These accidents are less dangerous than those which appear at the beginning of the administration. The statistics show that there is one death for every two thousand administrations of chloroform.

Third. Accidents which take place after the administration of the anesthetic, and which are due to the saturation of the organism with chloroform.

The accidents observed in connection with ether are less dangerous. The accidents which take place are almost always of asphyxiating character, and if the contraindications against the administration of ether have been taken into account those accidents will be prevented. The statistics of Gurlt give one case of death for every twenty-six thousand cases of ether anesthesia, and it should be noticed that these statistics embrace all sorts of operations and patients. It is evident that no case of extraction can be compared with abdominal operations, which sometimes last two or three hours, and which are practiced upon weak patients. We, on the contrary, practice upon healthy persons, and we ought not to practice on any but healthy individuals.

The accident that we should fear the most, and the one that we should always try to prevent, is cardiac syncope. It can be caused by ether as well as by chloroform, but chloroform can cause it from the beginning of the administration. In the case of ether it is necessary that the organism should be strongly impregnated with the agent before this syncope can have an opportunity to take place. We are also notified of the danger by the appearance of the respiratory syncope, which is a prodromic sign, and against which efficacious means are at our disposal.

A physiological explanation of this difference can be found in S. Schmidt's work on "The Alterations of the Heart under the Influence of Chloroform." We point them out because we do not believe that reference has been made to this difference in any of the works on general anesthesia. Schmidt anesthetized rabbits, dogs, and monkeys several times with chloroform, and noted in those animals changes in the cardiac ganglions. These changes are more marked in rabbits and dogs than in monkeys, and more serious in animals that had been under the influence of the anesthetic several times than in those that had it administered for the first time. The lesions are of a nature resembling cadaveric alteration, which is, according to Schmidt, the beginning of general nutritional changes rather than the local action of chloroform. In those animals in which the anesthesia was induced by ether no changes in the cardiac ganglions were observed.

Taking our stand upon reasons that seem to us to be very important, we reject chloroform anesthesia for the extraction of teeth. First we have the statistics which show us that the accidents due to chloroform are more numerous. None of these accidents are observed when ether is administered in *dental doses*. We will define

this expression. We say the "obstetrical dose," the "surgical dose" of chloroform. We mean by the dental dose of ether: First, the administration of this agent to healthy persons who do not present any of the contraindications that we have described in the previous lines; second, with the anesthesia carried far enough to suppress pain, but never long enough to impregnate the organism with the anesthetic agent to such an extent that syncope may follow,—a condition which does not occur with ether before the tertiary period has been reached. The accidents of the beginning, the primary ones, are unknown in ether anesthesia, and the accidents of the second period are only accidents of asphyxia, almost always easily suppressed.

We will enumerate the contraindications against the use of ether; not from an absolute standpoint, but from the standpoint of dental operations.

First, all the affections of the respiratory system. According to our opinion these contraindications are absolute ones. Ether should not be administered to tuberculous and emphysematous patients, and to those suffering from bronchitis and from ectasis of the bronchi. In the case of operations which are not of a very serious character, it is better to wait until the condition of the pulmonary system is absolutely normal. It has been demonstrated that the accident which follows the use of ether is nearly always that of asphyxia, which surely would be increased by the presence of pulmonary lesions. The examination of the lungs should be made at first, and the dentist should not give the anesthetic if the result is not satisfactory. We had an experience of this kind a few days ago in the case of a young foreign student who was suffering from the vicious evolution of a third molar, and who, being very nervous, refused to have the tooth extracted without an anesthetic. As he had pulmonary lesions of bacillary order, we refused to administer an anesthetic. One of our distinguished surgeons of the hospital consented to anesthetize him with ether. A few minutes after the administration was started serious signs of asphyxia began, and these would have had serious consequences, according to the opinion of the surgeon, if the patient had not been in a hospital where so many assistants were ready to use the treatment prescribed in such cases.

The same week we refused to anesthetize several other patients who presented pulmonary lesions of slight character. One case was that of a woman forty years of age, who presented a thoracic deformity with a slightly accentuated pulmonary emphysema. The other case was that of a woman thirty-five years old, in whom we observed an induration of one apex and also a slight bronchitis. In none of these cases the lesions were of such an extent as to contraindicate the use of an anesthetic for any operation except for a dental one.

Besides the pulmonary lesions the condition of the circulatory system furnishes contraindications to the use of ether. The heart should be carefully examined. Any advanced cardiac affection should afford a strong enough reason to reject the administration

of a general anesthetic in connection with dental practice. When a valvular lesion exists which does not cause evident symptoms the question becomes a more delicate one, and an invariable rule cannot be laid down. It is a question of clinical character, and the contra-indication is not an absolute one. It is always good to use an over amount of precaution, but the practitioner should not be timid and should know how to accept responsibility. In some cases it happens that the intervention without an anesthetic has worse effects than those following the administration of a general anesthetic, especially when the patient is extremely sensitive, timid, or even when cardiac weakness or disturbance exists. Every one knows the syncope that follows a severe, painful sensation. This syncope is sometimes fatal, even in healthy individuals.

Following is the description of a serious case of this character: A woman of about thirty years of age consulted us for what she thought was an affection of the gums. She had a very offensive breath, of such a severe degree that it was impossible to stay near her. An examination showed that the gingivo-dental region was in a tumefied condition, and was suppurating; the remaining teeth and roots were in a horrible condition. The general condition of the patient was very serious. She was suffering from anemia, which in time would have induced a cachectic state. She was very emaciated, and presented signs of intoxication, gastric catarrh, and diarrhea. The first thing that we thought was necessary to do was to extract all those bad teeth and roots. The seriousness of the general condition of the patient contraindicated the use of ether, for we had also discovered a double mitral lesion. We abandoned the idea of administering a general anesthetic, and after some insistence we got the patient's consent to operate without using a general anesthetic. We prescribed the use of a mouth-wash of potassium permanganate, which she used during the two hours preceding the extracting operation. At the first sitting the patient was very much afraid. We used chlorid of ethyl to secure local anesthesia, but our especial purpose was to suggest to the patient the idea of a painless operation. Some of the teeth were rapidly and easily extracted, but after the fourth extraction the patient became highly excited, and the respiration was rapid. We thought then that it was a wise measure to abandon the operation in order to attend to the general condition of the patient. She was put in the dorsal decubitus. The pulse was extremely rapid, but very perceptible, and there was a tendency to syncope. After a few minutes the patient regained her normal condition, and after two hours of observation she left the office. Two days after the operation was continued, and the same phenomena took place as in the first sitting. It took eight sittings to complete the extractions, because only a very limited number of roots could be extracted at each sitting. The general and local condition of the patient improved rapidly after the conclusion of the extractions; all disagreeable phenomena disappeared, and the patient's general condition improved very much. We have thought many times that probably it would have been better if all the extractions had

been performed in one sitting with the patient under the influence of ether, taking in advance all the precautions required by her depressed condition.

To recapitulate, we will say in a general manner that the administration of a general anesthetic to patients suffering from fatty degeneration of the heart, from insufficiency or constriction of the aorta, from aortic lesions, is contraindicated. With regard to the lesions of the mitral orifice, and if the case demands the use of an anesthetic, ether can be administered, provided that otherwise the condition of the patient is good and the lungs are in a perfectly normal condition. The condition of the kidneys should also be taken into consideration. The urine of all patients to be anesthetized should be examined, and we must confess that in practice this precaution is not always observed, to the detriment of the patient. If any albumin is discovered the patient should not be submitted to the effects of a general anesthetic. Epileptic and hysteric patients should not be put under the influence of an anesthetic, but here also the rule is not an absolute one.

Pregnancy alone is not a contraindication. We will even say that, on the contrary, it is rather an indication. It is a known fact that laparotomy and even the amputation of the neck of the uterus have been performed in a pregnant woman without any evil result. Why, then, could not extractions be performed? But, acting on general principles, it is better to wait until the patient is delivered, provided that the case is not one which is causing continuous trouble. We have not had any opportunity to administer ether to pregnant women, but we have administered hyponitrous oxid very often and have never observed any bad results. The same remarks hold good for the nursing period.

The presence of goitre more or less voluminous, as frequently found in women, may be a contraindication. When respiration is disturbed and asphyxia has a tendency to take place the circulation is less active in the thyroid body, which is more or less hypertrophied; and the blood stasis may bring about a new increase in the volume of that body and increase the opportunities of peritracheal compression. Hence the manner of breathing of persons having an hypertrophied thyroid body should be carefully examined. It is impossible to give a fixed rule for this kind of patients. We have had the opportunity to etherize a woman who had goitre, and she supported the anesthetic in a very calm way.

It is a very well known fact that it is more difficult to induce insensibility in alcoholics by means of ether than by means of chloroform. The exciting period appears sooner and is more intense than in ordinary cases, and sometimes it is impossible to induce insensibility. Alcoholism is not a contraindication, but is very often the cause of unsatisfactory results.

(The essayists stated that they always operate in their office, and pointed out the disadvantage of operating on patients who had to remain in bed. The disadvantage of operating on a patient sitting in the dental chair was also referred to.) If ether is used as the anesthetic agent, and if all the necessary precautions are taken, it

can be said that a fatal accident is nearly impossible to occur. It is certain that nobody can be positive as to the result of operation's upon human beings, but we only want to point out that death under ether anesthesia can only take place under circumstances difficult to encounter.

It may be that we will be reproached for advancing too absolute statements, but we are talking from experience, for one of us has assisted in as many as six or seven thousand etherizations under the direction of his teachers or under his own responsibility, and has never witnessed any serious accident. We have never seen in the case of ether anesthesia those serious and fatal phenomena which we have seen in the case of chloroform anesthesia. The possibility of an accident following ether anesthesia should not cause us to refuse the administration of this general anesthetic, provided that all necessary preventive measures have been taken. The first thing the operator should do is to assure himself that all the organs of the patient are in a perfectly healthy condition. This is absolutely essential. The patient should not have taken any liquid or solid food since the day previous to the operation; the stomach must be empty. The reason for this lies in the possibility of vomiting during the anesthesia, and the possibility of some of the rejected matter getting into the respiratory tract. The operator should assure the patient of the safe character of the operation, and of the absence of the slightest danger.

To operate under good conditions means to have a dental chair in which the patient can be put in the dorsal decubitus. It is of great advantage if the chair can be put in such a position that the feet of the patient will be at a higher level than the head. In this way if any abnormal symptoms appear they will be readily suppressed. The patient should not have any tight clothing on, and should be warmly covered. Besides this the operating room should be kept at an appropriate temperature.

The operator should never be alone, and should always have an assistant capable of offering intelligent aid in case of accident. Besides this professional assistant, the operator will need two more assistants that he will easily find in his office *personnel*. The duties of these assistants should be to help to maintain the right position of the patient and to clean away with sponges the blood which obstructs the view of the operating field. The instruments should be ready, and should be placed on a glass table near to the operator. The ether must be of unexceptionable quality and free from all impurities. The anesthetic is administered by means of a cone lined with an impermeable material, or by means of a mask. We use the mask. We place a piece of sponge in the bottom of the appliance. It is this sponge that is impregnated with the ether. The eyes of the patient should be protected from the irritative property of ether by means of a thin piece of linen cloth. The mask should be gradually carried to the face while the patient is induced to take deep breaths. Words of encouragement should be addressed to the patient, and the mask is then applied little by little against the face. Sometimes at this moment a sensation of suffo-

cation is felt by the patient, but it never lasts long. After a minute or two more ether is poured on the sponge, being careful that the liquid that is not taken up by the sponge does not remain on the mask. The same procedure is begun anew one or two minutes after. Sometimes when the ether used is of superior quality some coughing is produced on account of its irritating property. The only thing to do if such condition occurs is to remove the mask from the face for a few minutes, so as to let some air in, and the coughing will generally cease.

After four or five minutes the exciting period begins. This varies in different individuals. Sometimes it is slight, and sometimes it requires that the patient should be firmly held by the assistants; this takes place with alcoholic patients. The exciting period is less when a good quality of ether is used. Slight or strong, the exciting period is always present, and if it does not take place the results expected will not be manifested. The patient will sleep, but will not be insensible to pain; and if the operation is started sensibility will be easily regained.

The exciting period over, muscular rigidity ceases little by little; respiration becomes more calm, and very soon muscular relaxation will take place. Raise an arm and it will fall; pinch the nose and the patient will not feel any sensation. Then it is time to begin to operate, but as in operations in the mouth the administration cannot be continued, if it should be necessary the practice of administering a little more ether is a wise one where several extractions have to be performed. We base our judgment on the condition of the cornea; as long as this remains sensitive the operation should not begin. If the pupil is examined it will be observed that it is in a contracted condition; the anesthesia should not be carried to the point of causing its dilatation. As soon as the cornea is insensitive remove the mask and begin the operation.

It is sometimes stated that insensibility is complete after a period of time varying from three to five minutes. We declare emphatically that this assertion is far from being an expression of the truth. Very often it is true that the patient is after that time in a condition of complete quietness which resembles a state of insensibility, and which permits us to begin the operation, continuing to administer more ether, but, as before said, this cannot be done when operating in the mouth. If it is a question of performing a few easy extractions this could be done, but as a general rule the anesthesia is never obtained before eight or ten minutes. If the operation is begun too soon the patient will return to normal condition before the operation is over, and then the blame will be laid upon the anesthetic. All through the operation the assistant will watch the respiration with great attention.

We will repeat that in the case of ether anesthesia all the attention should be directed to respiration. There is no syncope to fear in a healthy individual, even while in the sitting posture. When using chloroform the syncope generally takes place when the patient is in that position.

We believe that the extraction of teeth of the right side of the

lower jaw when the patient is under the influence of an anesthetic is the most difficult among the extracting operations.

The operation over, the chair is again put in the horizontal position, and the head of the patient is put on one side to favor the flow of the blood from the mouth. If good ether has been used the quantity inspired is small, and the patient will rapidly regain consciousness. The patient should not be permitted to leave the office immediately, but should rest in a horizontal position for a few hours.

The post-anesthetic effects are very simple. Immediately after consciousness is regained the sensations experienced are sometimes very disagreeable, on account of the nausea and vomiting which sometimes may take place; but when ether of good quality is used this period is very short. The patient may expectorate the blood swallowed during the operation, and should be advised of this fact, otherwise he or she may become alarmed. After a few hours the patient will be able to leave the office, and should return home in a carriage.

One of the objections raised against the use of ether, at least when compared with chloroform, is that the nausea and vomiting which ensue from its administration are of a more painful nature, but, as already stated, if the ether be of good quality it will greatly diminish this very disagreeable phenomenon. Nothing is so far from being proved as the advantages of chloroform over ether. The anesthesia described in the foregoing pages can be considered as the type of anesthesia. It must be said, nevertheless, that anesthesia is not always induced with so much facility, and that the administration is sometimes interrupted by disagreeable incidents. It is often observed that excessive tracheal and bronchial mucus is produced, and this we consider its most serious inconvenience and recognize that it may be of grave character when the operator is an inexperienced one. This production of mucus is due to the irritant action of the vapor of ether upon the mucous membrane of the respiratory tract. This excessive secretion brings about an obstruction in the respiratory tract, requiring attention in order to prevent the evil results which it may otherwise induce. If the secretion be not very abundant it will not be of any consequence, but if the quantity is such that respiration is interfered with the patient should be laid on one side and the mouth and pharyngeal cavity cleansed with cotton, and when the mucous secretion is removed respiration will immediately become normal. The same treatment should be followed if the condition repeats itself.

It has been said that the production of mucus is greater in children than in adults, and even in Lyons, where ether anesthesia is the rule and chloroform the exception, this last agent has been generally employed in the hospital for children. It is our opinion that this objection is not well founded. We have never observed anything to support it when ether has been administered to children.

We do not believe that vomiting is more intense with ether than with chloroform. The partisans of chloroform are of a contrary

opinion. The question is not yet settled. It has been said that the best way of arresting vomiting is to give more ether, but caution has to be exercised in this direction. The patient should lie on one side and the mucus be removed with a piece of sponge, when the administration can be continued. It may happen that at this time the phenomena of beginning asphyxiation may take place, the face becoming of a violet coloration and the patient making efforts in order to inspire some air. If such is the case open the patient's mouth, grasp the tongue with a special forceps or with a hemostatic forceps and draw it forward, and sponge the mouth and fauces; respiration will then become normal, and the face will regain its color. In five hundred administrations of ether for dental operations we have never observed any phenomena of a more serious nature, and for dental operations the amount administered is never enough to saturate the organism, and the use of all the preventive measures already described should be very seldom required. We should rather say that it is nearly impossible that circumstances should require their use.

To recapitulate, we will say that the phenomena that may follow the use of ether are of an asphyxiating character. Chloroform predisposes to syncope during all the stages of the anesthesia. With ether there is danger only at the third stage, when its administration has been carried to a point not possible to be determined in a precise way, but which without a doubt is beyond the time required to produce anesthesia for dental operations. For this kind of operations it is very seldom that the anesthesia is not produced in ten or fifteen minutes, and it can be said that not before *one hour at least* is the third stage of the anesthesia reached. It may happen that at the beginning of the anesthesia respiration is interfered with on account of the falling of the tongue backward. Against this condition we possess a very good antagonistic measure, which consists in raising the chin. This is done by extending the head to a somewhat forced position. Respiration begins immediately after in a normal way. As soon as respiration has a tendency to become sonorous put this measure into action, and the effect is immediate, provided that the nasal passages are not obstructed. If this is not efficient, then pull the tongue with a forceps. If the cause of the asphyxia is only due to the tendency of the tongue to close the entrance of the respiratory tract, a deep inspiration will follow the manipulation already described. If the contrary occurs, then a quantity more or less abundant of mucus has been produced, and this will have to be removed as already described. Lastly, if the condition becomes very serious, artificial respiration should be practiced.

We have not discussed all the possible accidents which can take place with ether anesthesia. We have not considered the case of the patient being in a weak condition or suffering from affections such as intestinal obstructions with profuse vomiting, or where the operation has to be performed on patients not previously prepared (with a full stomach). In such cases vomiting can be the source of serious accidents, which may impose the necessity of performing a tracheotomy if the rejected matter enters the trachea.

Even when the anesthetic agent is administered for dental purposes, and under the most favorable conditions already described, there is a possibility of a serious accident taking place, although its occurrence is very rare; we mean the falling into the respiratory tract of a portion or of the entire extracted tooth. This very serious accident is perhaps the only grave objection that can be raised against the use of ether, but this objection can be raised not only against ether anesthesia, but also against all the inducers of general anesthesia. It is an elementary notion that all the necessary precautions must be taken in order to avoid this accident. If, nevertheless, a tooth or root should escape from the forceps the patient's head and body should be leaned forward while with one hand the mouth is explored, and the patient should not regain the previous position until the operator is sure that the foreign body has been expelled. This measure is extremely dangerous if chloroform has been used, and syncope may be produced in this way. This is not the case with ether when given for dental purposes; at the most a slight asphyxia may be produced on account of the flexion of the head, and once the foreign body is rejected the asphyxia ceases rapidly if the method already described has been put into practice. But if, on the contrary, the foreign body is not rejected the situation may become highly dangerous. In such a case the operator must decide without any delay to perform tracheotomy.

The inflammability of ether constitutes for some surgeons such a danger that they refuse to employ it. It is enough to know, however, that there is a possibility for such an accident to occur to take all the necessary measures to avoid it. It must be especially remembered that the vapor of ether may take fire when in contact with the cautery heated to a red-white heat.

We have mentioned the immediate consequences of ether anesthesia, which are nausea and vomiting. A few hours after the operation the patient can return home; it is preferable that they do so in a carriage, and that they rest during that whole day. Five hours after the operation they can take a little bouillon, and if well borne some more can be taken after an hour. Two or three hours afterward they can take some solid food, and on the next day they may follow the every-day routine.

With regard to the remote effects of ether, we will say that we have never observed any phenomena of this kind. It has been said that ether favors the production of pneumonia, broncho-pneumonia, and bronchitis, but this is surely due to the difference in temperature between the operating room of the hospital and the wards.

The essayists reject the practice of repeating the administration of ether in connection with dental operations, for the reasons already mentioned in the course of the paper, and prefer to finish the operation with the patient in a semi-conscious condition.

Discussion.

Dr. JEAY. We are very glad that we have been able to listen to this communication, and I will ask Dr. Tellier if he has not observed

that the after-effects are more annoying in the case of ether than in that of chloroform.

Dr. TELLIER answered that his experience had taught him that this was not the case, and quoted the observation of a woman of twenty-five to thirty years of age who had been put twice under the influence of chloroform, and every time suffered horrible after-effects, while the third time that she had to be anesthetized it was done with ether, and this time the patient felt no disagreeable effects.

Dr. JEAY. This year we have had four or five cases of etherization that were followed by prolonged and annoying effects.

Dr. TELLIER. You cannot found a judgment on the observation of a few cases.

Dr. JEAY then pointed out the dangers surrounding the manipulation of ether on account of the inflammable character of this compound, and said that a few accidents of this nature had already taken place.

Dr. CORREVON. Ether can be administered during the night, taking care to use lights placed very high, because the vapors of ether always sink.

Dr. TELLIER. Once I operated on a patient who was under the influence of ether, and I used the thermo-cautery to stop the hemorrhage; but this was only heated to a dull red, and nothing happened.

The PRESIDENT. If nobody else wishes to make any remarks we will thank Drs. Tellier for their very interesting communication, which will aid us in deciding which anesthetic is the one that presents the greatest advantages.

The president then called on Dr. L. C. BRYAN, Basel, to read his communication (of which an abstract follows) entitled

DENTAL ANESTHESIA BY COMPRESSION APPLIED TO THE AURICULO-TEMPORAL REGION.

The purpose of Dr. Bryan's paper was to describe a special method of producing insensibility to pain. The idea was suggested to him by observing the patients who go to the hospitals for the purpose of undergoing operations accompanied by some person instructed to exercise pressure while they are operated upon. It occurred to the essayist that this pressure could cause an anesthetic effect. He then followed in his practice the method of pressing the patient's head under his arm while he prepared a cavity, but in holding the head in this way it was sometimes very difficult to operate. He then constructed an appliance to hold the patient's head and to exercise the desired pressure. Those two pieces (he said, pointing to the blackboard) are two springs. The ends are held by the patient, who presses them against the head. A steel band goes around the head, and two little cushions over the ears. Dr. Bryan has constructed an appliance composed of a steel band encircling the head, with cushions under the ears and over the temporal region. This band goes down far enough to enable the patient to hold it in his hands, and by jerking it pressure is made

against the region where the ear-cushions are located. As the results were very satisfactory, the patients were found to demand its use after it had been once tried.

Dr. Bryan believes that his appliance is a good one, nevertheless he said that it was not a perfect one and invited the members of the Congress to see if they could improve it.

All the operations that we perform, Dr. Bryan said, are painful, and many persons prefer to let their teeth become carious rather than go to the dentist. It is for these reasons that so many articles on anesthesia have been read at this Congress. He said that he did not bring his appliance with him because it was as yet a very imperfect one. Besides, the purpose of his article was not to show any appliance, but just to point out the principle of this method of producing insensibility.

Discussion.

A MEMBER asked Dr. Bryan if he did not tell his patients that they are not going to feel any pain, as he thought that suggestive influence was a part of his method.

Dr. BRYAN. It is possible that suggestion is a part of my method. The patient is also busy handling the instrument, and he generally believes that he will experience less pain.

A MEMBER. I believe that the local action of the suggestive anesthesia is produced by the retention of the circulation and through muscular contraction.

Dr. VIAU. If it were not for the fact that our colleague, Dr. Bryan, is such an experienced man, we could believe that the anesthetizing effect was due entirely to a suggestive influence. In fact, we all know with how much ease we perform a certain operation on one patient, while the same operation will be painful to another patient. Hence we see how variable the phenomena of pain are. But, as Dr. Bryan is a practitioner who has had much experience in the matter of anesthesia, I would like to hear his opinion as to the method suggested. I would like to ask him if the insensibility is really due to a suggestive influence or to the abolition of pain.

Dr. BRYAN answered by saying that in certain cases the results were very satisfactory, while in others they were not.

Dr. VIAU. The question of suggestion would be an interesting one to study carefully. We see this in many cases. Certain patients make up their minds to undergo an operation, and they accordingly bear it very well; while with others the most insignificant thing is the cause of much pain.

A MEMBER asked the following questions: (1) The exact region against which the appliance should be placed? (2) How does Dr. Bryan operate when he has to stand back of the patient, as in the case of extraction of lower teeth of the right side?

Dr. BRYAN. What I have explained does not refer to extractions.

(To be continued.)

PENNSYLVANIA STATE DENTAL SOCIETY.

THE thirty-second annual meeting of the Pennsylvania State Dental Society was convened at the Neversink Mountain Hotel, Reading, Pa., at 11 A.M., July 5, 1900.

The meeting was called to order by the president, Dr. ROBERT HUEY, of Philadelphia, and was opened with prayer by the Rev. A. G. ROGERS, of Reading, Pa., following which the Hon. N. WILLIS BLAND, Judge of the Orphans' Court of Reading, delivered an address of welcome to the members.

Judge BLAND, among other things, said: The State Dental Society represents an idea and a principle in modern legal life,—an idea that is becoming universal; that is, that people having a common interest have a common principle of action. They associate themselves together and bring themselves within the recognition of the law; they become a legal entity and a political fact, they become a corporation; they are a creation of the law, and they are an object protected by law. Just as soon as a group or class of men realize that they have the same right to be organized in corporations,—that they have a common interest, and that that interest can be furthered and served by a corporate entity or existence,—they get a charter; they become objects of legal existence and of legal protection. The qualifications of membership are prescribed by law; the powers and functions of the corporation are created and defined by law, and all those legitimate objects which the members of the corporation have in view are subserved by the law. Legal associations are alike in all essential respects of organization. They spring out of the same need. They all have behind them the same motive, they aggregate for the collective good and welfare of the members of the association. It is a modern idea,—not modern in a broad and historic sense, because nothing was more common three or four hundred years ago than the guild in the trades and professions of all those who had a common interest to bring them together.

There is no organization that more clearly demonstrates modern progress than yours does. It is not for me, because I am not competent to go into the subject, to speak in detail of the progress made through the corporate and collective activity of the societies of the state; but, from such knowledge as can be gained from an external standpoint by a simple lay observer, I should say that nowhere in this commonwealth is there a body of men that has made more progress in the development of their art in our age than the dentists of Pennsylvania. It is not so very long, not fifty years, since the blacksmith, the barber, and the clockmaker did not hesitate to call themselves dental surgeons; but, now, if a man of that sort were to pretend to practice your art he would be sent to prison for doing it, as committing a crime,—and so it ought to be. There is no art which has behind it, and pervading it, a more scientific conception of its best development and power than is shown by the dentistry of the present day. Much of this is a result of your organization, of your collective and of

your corporate action, of your co-operation, and of meetings such as this you have here to-day.

I find that ordinarily there are two objects to which a convention of this sort directs itself,—a sort of exposition and explanation of the art as it is and ought to be, and secondly, a sort of moral censorship over the conduct of its members. Art takes care of itself, and I think morality does too. A committee of censors may formulate what rules it will, it cannot make a good man out of a bad one. It has been well said that that man who takes the law alone as his guide is neither a good citizen nor a good man, and I believe it is true. You cannot make a good man through the agency or influence of external rule. The source of all good conduct comes from within, and better than all rules, better than all external mandates, is the noble and uplifting example of a good and noble life.

A member of your profession, having molded himself, having formed and corrected himself, and who shows forth a noble and exalted life, will have more influence upon the members of your profession than all the external rules you can form. I have heard of a man who came in contact with hundreds of your profession, but whom I never knew, some of whose books I have seen and read with a sort of sympathy and love. He seems to have been a sort of guide and philosopher and friend to the members of your profession, and I have come to have a sort of idolatry for his fame in common with yourselves. I think that that man's life and example have done more to influence, ennoble, and elevate the members of your profession than all the codes of rules your censors have made: and I mean Dr. Garretson.

The speaker closed his address by bidding the members welcome and expressing the hospitality of the residents for those who were present.

A vote of thanks having been tendered Judge Bland for his address of welcome, the reports of the various officers and committees were presented; after which

The PRESIDENT read his annual address, in the course of which he called attention to the highly prosperous condition of the society, the list of members being the largest at any time in its history, the roll of membership being recruited from twelve local organizations, five colleges, and three alumni associations. The treasurer's report was highly satisfactory, showing a balance of funds which places the society in a sound financial condition. Although the membership is large, the president felt that its influence for good should be extended by seeking out all deserving men in each district of the state and inducing them to join their local organizations, so that at the next opportunity they could be sent as delegates to the state society, through which means the membership of the state society is recruited. He spoke approvingly of the support which the several colleges in the state gave to dental association work, by encouraging the formation of dental societies among their undergraduates during their period of studentship. These student societies in his judgment

formed an admirable training ground for students in the methods of society organization, a work which made them valuable and enthusiastic members of professional organizations after their graduation. He felt that these young men should be at once sought out at graduation, enrolled and placed on duty in the great army of progress, and to understand that they are in line of promotion. In strengthening them we strengthen ourselves, and we may save many from the evils of charlatanism.

The president expressed himself strongly in favor of an increase in the standard of requirement for entrance upon professional study in dental schools. His experience upon the Board of Examiners of Pennsylvania had shown him that many applicants for license were deficient in preliminary education. While no definite standard had been fixed by the law of Pennsylvania, it was deemed wise by the Dental Council to adopt that agreed upon by the National Association of Dental Faculties and the National Board of Dental Examiners,—viz, entrance to the second year of a high school,—with the hope that it could be advanced in the near future. This standard was not, in the judgment of the president, sufficiently high for any one who seeks admission to the duties, privileges, and dignities of a liberal profession no longer in its infancy, but which demands recognition as the peer of every other branch of medicine.

Pennsylvania has for nearly fifty years occupied an advanced position in the cause of dental education. From a small beginning she has risen to be the foremost dental educational center in the world. From seven graduates in 1853 we have reached the astounding number of four hundred and eighty-two in 1900, and with this has come a most commendable advance in instruction. Compare the curriculum of the first Philadelphia dental college with the colleges of to-day, and it will give some idea of the great development that has taken place. Seven subjects were taught in 1853. Now students are instructed in at least twice that number, and on a much higher and steadily advancing basis which demands a much fuller preliminary education than was thought necessary in the earlier days. That the preliminary education has not kept pace with the professional is most painfully evident to the members of the State Examining Board. In view of these facts, would it not be wise to further advance the preliminary standard, and admit to the freshmen classes only those with sufficient knowledge to enable them to thoroughly understand and assimilate the instruction offered to them?

The State Medical Board provides a four years' high school course for all matriculates who upon graduation desire to enter upon the practice of medicine in this state, and as the dental and medical laws are identical on this point it would appear to be the part of wisdom to follow the example of our medical colleagues in this. The Dental Department of the University of Pennsylvania required of its matriculates last year a certificate of admission to a third year of a high school, and for the coming year will demand a certificate of graduation from a high school having

a three years' course, or three years' work in a high school having a four years' course or its equivalent. This is substantially the preliminary requirement of New York, and is enforced in all the dental schools of that state.

Interchange of license with other states having an equivalent standard is being seriously considered by many of the leading minds in our profession, many of whom believe this to be the first step toward unification of the dental laws. The New England states have effected an organization for this purpose, and New York and New Jersey have agreed upon interchange, and licenses issued in either state are now accepted by the other without re-examination. Efforts were made by Pennsylvania and New York to accomplish the same end, but much correspondence and several conferences have resulted only in a proposition from the Board of Regents to reciprocate upon the basis of a higher preliminary standard for all matriculates in the dental colleges. This the Dental Council decided that they were unable to enforce under the present law. Therefore if this society desires interchange of licenses with New York and New Jersey, it can be accomplished by a mutual agreement of the colleges, or by an amendment to the dental act providing for the gradual yearly increase of the preliminary standard for all matriculates until it reaches that provided by law for New York,—namely, graduation from a high school having a three years' course or three years' work in a high school having a four years' course, which is the standard fixed by the Dental Department of the University of Pennsylvania.

The president made certain practical suggestions for the amendment and enforcement of the existing dental law of the state, and for the codification and publication of the by-laws of the State Society in convenient form for distribution among the members; after which he made an appreciative reference to the work and character of Drs. Wm. N. Amer, of Lancaster; Dr. W. G. A. Bonwill, and Dr. Henry H. Burchard, members of the society who had died since the last annual meeting, and closed his address with an historical *résumé* of the circumstances which led to the formation of the State Society, as the result of a meeting of three of the local Pennsylvania societies held at Lititz Springs, Pa., in July, 1868.

Afternoon Session.

The meeting was called to order by President Huey at 3.15, and after the usual report of officers, the president called upon Dr. JOHN J. BURKE, of Mahanoy City, Pa., who read his paper entitled "The Best Filling-Material for the Temporary Teeth."*

Discussion.

Dr. C. V. KRATZER, Reading. I heartily agree with the essayist in advocating the use of copper amalgam in children's teeth. I have used it for that purpose for several years, and have had

*Printed in full at page 105 of this issue.

more satisfaction with its use than with any other material previously used. I have tried other materials and I think this is the best. I have used copper amalgam in the sensitive teeth of little patients who have come in complaining of toothache, and I have had the same gratifying results as reported by the author of the paper. As far as color is concerned, I think that is no objection when we consider the fact that these deciduous teeth will be lost before the question of the esthetic effect need be at all considered; and when we consider the benefits it offers, they overshadow any objection which we might possibly have to the material. I have used copper amalgam in the permanent teeth as well. In many cases where I felt certain no other material would preserve the teeth, as in molars with partially developed enamel, pitted and very imperfectly formed crowns, where the pits are invaded by decay, I have cut them out and filled them, especially in the first permanent molars, and have preserved them for many years where I felt that nothing else would preserve them, the enamel being thin and weak. The copper amalgam is easy to insert, little or no pressure being required, so that there is no danger of breaking the edges of thin and weak enamel. The preservation of the teeth has been perfect. Copper amalgam seems to have a chemical effect upon the enamel which in a measure renders it impervious to further decay, in those places where the cavity does not run beneath or above the gingival border.

The PRESIDENT. Do you consider that an objection in the deciduous teeth?

Dr. KRATZER. No, I have never observed any deterioration of the material, except that of loss from abrasion, which of course is no objection in children's teeth. It will never be enough to affect them materially.

Dr. H. C. REGISTER. I have often noticed in children's teeth in using copper amalgam, that there is an absence of electrolysis, while with adults it is often liable to occur. Where copper amalgam is used, we get that wasting of the material through an electrical condition, and I think it is deleterious to the system at large. I have never seen it in a child's mouth where I use copper amalgam, but I think it wise where we use copper amalgam, or any amalgam, to wash it with alcohol before placing it in the cavity. By so doing we remove the oxids present and get a more intimate contact of the filling with the tooth structure, and greater solidity of the filling itself. Undoubtedly we can use copper amalgam of this character and get good results, and by washing it as I have suggested we obtain a much better wearing quality for the resulting filling. The jet-black appearance is not related to the preservative quality of the alloy.

I have also to suggest another matter in adapting amalgam to the cavity, whether we use it wet or dry, and that is to pack it under rotation. By this method we can use the alloy in a little dryer state. By applying friction with a rapidly running smooth bur-nisher the alloy will soften, and it can be packed into more intimate contact with the dentin, which is a desirable factor in giving protective quality to the filling.

Dr. H. B. HICKMAN. What drug does the essayist apply to the pulp before he inserts the copper amalgam?

Dr. BURKE. The same as I use on every pulp,—one I have been using for three or four years experimentally, but which I do not think I have used sufficiently long; I want to test it for a longer period of time, and if it continues to turn out as it has been doing I may have something to say about it hereafter.

Dr. HICKMAN. I want to know if there is any drug you can put on a pulp and cap it with amalgam?

Dr. BURKE. In the case I spoke of there was a potential exposure. If there was an actual exposure I would not apply amalgam immediately. I would introduce a little piece of paper moistened with an antiseptic. I would not hesitate to put amalgam on that.

Dr. S. B. LUCKIE stated that he had tried copper amalgam for a very short time, and had discarded it altogether from his practice. He had no use for it in either the deciduous or the permanent teeth. He thought the successes of the essayist might be attributed rather to the secret drug he mentioned than to the copper amalgam.

Dr. HIRAM DEPUY, Pittsburg. Some years ago I witnessed the excavation of some Indian mounds near Pittsburg, and among the substances removed were some copper plates that had apparently been in contact with the body at the time of burial. The mounds contained three skeletons, and in apposition with these plates were the remnants of some vegetable fiber. Among other things exhumed were the teeth of an American lion or puma, which were covered with swaged copper, and which compared very favorably with some of the crowns made to-day. The copper specimens are on exhibition at Pittsburg, and the teeth are in an excellent state of preservation with the exception of a stain which runs from black and drab to a greenish hue. From the best estimates three hundred to six hundred years must have elapsed since they were buried. We know that copper will prevent deterioration of organic substances.

Dr. J. A. LIBBEY, Pittsburg. I am surprised to hear Dr. Luckie express himself as he did. I should have supposed that he would have investigated copper amalgam, and if there proved to be anything good in it would hold to it; but, from what he says, I hardly think he found anything good in copper amalgam. I commenced to use the material in 1883, and became enthusiastic about it, though I had some failures from the wasting described by the essayist, but I have never dispensed with the use of copper amalgam; I use it continually. I have found that there are certain localities in the mouth where copper amalgam will waste and certain localities where it will not,—that is, along the cervical border. In hypersensitive cavities along the buccal surface of molars, where it is almost impossible to prepare them thoroughly for filling with any other material, I dry them out as well as I can, and by filling with copper amalgam I can save the teeth with less preparation of the cavity than with any other material I have ever used, and I am satisfied that the essayist is on the right track with reference to

that. Not only in those cavities, but in those of children's teeth, if Dr. Luckie will try it in hypersensitive cavities along the buccal surfaces I am satisfied he will never come to a meeting again and say he would not use copper amalgam. I know of no material that will so well preserve the tooth-structure in the cases I have mentioned.

Dr. ROBERTS requested the views of the president on the subject.

Dr. HUEY. I remember once having advocated the use of copper amalgam in a certain class of cases a number of years ago at the Academy of Stomatology, and I was rebuked with much disdain by my friend who has just seated himself, who said he would not use copper amalgam under any circumstances. I have used copper amalgam in the class of teeth spoken of by the essayist; that is, in the first molars of young children where the structure was soft and poorly calcified and the decay had not extended to any considerable depth. I remember saying at the time this discussion took place at the Academy of Stomatology that I thought it was a shame for the intelligent men there at that meeting to absolutely discard copper amalgam without giving it a fair trial. I said there were possibilities in it that were never brought out and investigated, and I say so to-day. I think there are classes of cavities in the first permanent molars, at about six or seven years of age, in which it is a very valuable agent for suffering teeth. I still use it for that purpose, and still hope to use it for that purpose, but it is a very dangerous material to use on approximal surfaces. It will waste at the cervix. To my sorrow and that of others who have used it, pulps have been exposed,—and I was to blame for it,—caused by the wasting of the filling-material at the cervical border. I think it is a very dangerous material to use at that point. I have never so used it since the fatal time of finding one or two pulps exposed in connection with filling of that character.

Dr. LIBBEY, in answer to a question, stated that he had found wasting in a very few cases along the cervical border where the filling is put upon the buccal surface. In adults where the filling becomes oxidized, the blacker it gets the better will be the preservation of the tooth-structure; but if it does not discolor, that is a warning to remove it. There are, however, very few cases where it does not become very black, but with large approximal fillings there will be no discoloration and there will be waste.

Dr. KIRK. I want to first commend the essayist for his courage, in coming before an audience of this size and of its intelligence and advocating the use of copper amalgam, but I am quite in harmony with the sentiments expressed by the president and also by Dr. Libbey. It does succeed at times, and when it does it succeeds wonderfully well. I know of no material that, when successfully used, so thoroughly prevents decay; I know of no material that, when it fails to arrest decay, fails so abominably as copper amalgam. It has been stated here that copper amalgam has an antiseptic value. That is not a mere guess. The question has been investigated carefully, and it is a matter of record that copper amalgam does have an antiseptic value.

Thos. Fletcher, of Warrington, is, I believe, authority for the statement that in many cases where a copper amalgam filling has been inserted and afterward lost from a cavity carious action has been permanently prevented, even though the tooth remains unfilled, because of absorption of the copper salts into the dentinal structure. Reference has been made to the fact that when a copper amalgam surface becomes black it may be considered certain that the amalgam will not waste or change its form, and there will be no disintegration. That is quite true. It seems to me to be a wrong attitude toward this material to discard it simply because in some cases it has failed to accomplish the best results. We should investigate the problem and see just why it is that it fails in some cases and in others succeeds so well. Those of you who have used copper amalgam will have noticed that in the process of wasting away the surface becomes bright and highly polished with a metallic luster. There is apparently a slow solution of the amalgam going on. It becomes dished out or concave in the center, and finally the filling loosens from the walls.

I have reason to believe that this process is a disintegration due to chemical solution in connection with local electrical action in the filling itself. I made some study of this matter a number of years ago, when copper amalgam was introduced in this country under the name of Sullivan's cement. That preparation, I believe, was made by amalgamating precipitated metallic-copper, thrown down from a solution of the copper salt by means of plates of zinc or iron. Copper amalgam so made is much more likely to undergo disintegration than copper amalgam made by electric deposition. When the amalgam is made by the old process, the precipitation of the copper and its subsequent washing with dilute acids previous to amalgamation gives opportunity for the formation of a film of oxid upon the mass of finely divided copper before the mercury is added to it. The copper oxid is soluble to some extent in the amalgam, or it may prevent a perfect chemical union of the mercury and copper, so that the resulting mass will not be homogeneous, but will be composed of particles of unamalgamated copper distributed throughout the mass of copper amalgam. Such a mixture, subjected to the action of a fluid capable of exerting a solvent action upon it, will develop a local electrical action because of the difference in potential of the two substances, free copper and copper amalgam, of which it is composed. The amalgam should be absolutely homogeneous, and in order to secure that result should be made by depositing the copper into a film or body of mercury by the method of electro-deposition, such as is familiar to you all in the ordinary process of electro-plating. By this means the oxidation of the precipitated copper is entirely avoided, and a homogeneous amalgam mass results. My experience with a copper amalgam so made has been entirely satisfactory.

There is another feature of copper amalgam which is important,—namely, its unchangeability as to form. It is said to have the same specific gravity in its plastic as well as in its solid state, and Black's experiments show that it does not shrink or expand. It is

the only amalgam, so far as I know, which neither shrinks nor expands. So there are several features about it which should certainly commend this material to our favorable consideration. It seems to me to deserve at least our investigation as to its causes of failure and our efforts to overcome them, rather than our tendency to discard what we know is, in some cases at least, a very valuable material.

Dr. KRATZER. My experience with copper amalgam in buccal cavities is entirely opposed to that of Dr. Libbey. I would not attempt to use copper amalgam in any large buccal cavity where the border of the cavity or the filling comes in contact with the gingival border. My experience in such cases has been invariable that there has been wasting away of the material, and a formation of a new cavity or an extension of the old at the end of the filling.

I presume from the relative experiences of Dr. Hertz, Dr. Libbey, and myself that Dr. Hertz and I must have used the copper amalgam manufactured under the old method, and that Dr. Libbey must have used that which was manufactured by the process described by Dr. Kirk, because the fillings which I inserted on approximal and buccal surfaces of the molar teeth have not been satisfactory. I have used copper amalgam in filling the roots of very weak teeth which I desired to crown, and which I did not dare to use without some firm support. For example, in cases where scarcely anything but the cemental covering of the root is left and the walls are very thin, and in some cases yielding, I have lined roots of that sort with copper amalgam, giving it time to set, taking advantage of the quality of which Dr. Kirk has spoken,—that of retaining its position and form. At a future sitting I have inserted crowns on such roots, and my experience has been that such cases have been perfectly satisfactory.

Dr. HERTZ. I commenced using this material in 1886, when it was first imported, and a year or two later when it was made in America and used in various forms. I found the old Sullivan cement behaved just as Dr. Libbey has described. Where it remains black it invariably remains in place, but where it becomes white or lustrous and begins to waste away it is soon lost, and a condition of hypersensitiveness of the dentin is an accompanying feature of the process. I have found the same conditions with Sullivan's cement as with others. As to the method spoken of by Dr. Kirk, I would like to know whether the preparations in America were the same as Sullivan's.

Dr. HUEY. I always understood that the copper amalgam made in this country was made by precipitation, the same as the Sullivan cement, but that later, newer preparations were made in a more exact way, and that different results were obtained. I have used copper amalgam for closing perforations in root-canals, and I have found that I could do it better with copper amalgam than with anything else I have tried, and without any pressure and with no irritation of the pericementum. I recall one notable instance where a pulp-canal was treated in London by an English dentist, who drilled

through the bifurcation of a lower molar, and in consequence the patient, a young lady, had very serious irritation, which I was unable to subdue until I closed the aperture with copper amalgam. It has been perfectly comfortable since.

Dr. BURKE, in closing the discussion, said: I don't know about being a brave man, as Dr. Kirk said. Perhaps it is not so necessary to be brave just to bring the subject of copper amalgam before an audience of this kind as it is to bring a subject before an audience which you know will pervert it. I felt assured that the discussion would take the course it has taken. The paper was meant to advocate a special use of the material. A year ago last spring, at our meeting in Scranton, in a five-minute talk I announced this subject of filling children's teeth with copper amalgam. It provoked a warm discussion, which had a tendency, of course, to go into the defects of copper amalgam as a general filling-material, and I feared afterward that I might be considered as an enthusiast in the use of copper amalgam generally. So last spring, when called upon to read a paper before the Susquehanna Dental Society, I took up this subject and tried to make my position clear in regard to the general use of copper amalgam. I do think that at this stage of our experience, with all that has been written and with all the experiments that have been made with copper amalgam, we ought not to find it necessary to discuss its qualities much as a general filling-material. We all know it is an excellent saver of soft teeth, because of its tendency to waste away in certain locations; we all know it is a defective material. But what struck me was that in using it for this one specific purpose, the saving of temporary teeth, I have never found fault with it. Only recently, within the last month, I had occasion to see a little patient of mine for whom I commenced filling seven years ago, and I found those fillings and those teeth were as perfect as the day they were put in; and that has been my experience all through the ten years I have been using it. I came to the conclusion that if it would do that, why should it not be advocated as a filling for the deciduous teeth? I looked into the literature on the subject. There was a symposium in the DENTAL COSMOS, and I carefully read it, but found no mention of the filling-material I had been using; nothing was said about it. Since, and before, I have read articles, and they have advocated gutta-percha, gold, etc., but never once have I seen this mentioned. I thought it was rather strange, but I did not have the courage, or something else,—discretion, if you please,—to bring this matter before the profession to advocate it until I had used it what I considered a sufficient length of time to know if it had any qualities which rendered it difficult or dangerous to use. Then I came to the conclusion that I ought to make it known, and that it might help somebody as it helped me. We have all received freely. What would we do if people had not given us their ideas? I give my idea of this simply as a filling for the deciduous teeth.

As to the use of copper amalgam in the permanent teeth, that is discretionary. Where the teeth are of a poor structure and the less probability there is of saving them with ordinary amalgam,

the more probability there is of saving them with copper. I would not expect copper to do well in ordinary circumstances. It seems as though copper amalgam has an especial love for white, chalky teeth, and where a tooth is presented that is all decayed away on the posterior buccal surface and I find nothing there but a point,—a pivot, you might say,—I can't cut that away and build it up with copper amalgam and expect to have good results; whereas with an ordinary filling, put in a tooth with good structure, I would expect it to wear away. In any tooth, wherever it is, if you think that any other material will be serviceable I would not advocate its use. Where you feel you are at your wits' end to save a tooth, I think it can be saved better with copper than with anything else.

I wish it understood that I stand here as a champion for this material as a filling for a special purpose. It has for ten years done everything I could expect of it. I have brought my knowledge of it to the profession, and with that I am done with it. I shall continue to use it myself, and of course others can do as they like.

On motion, the subject was then passed.

(To be continued.)

OFFICERS OF THE PENNSYLVANIA STATE DENTAL SOCIETY.

FOLLOWING is a list of the officers and standing committees of the Pennsylvania State Dental Society elected at the annual meeting held at Reading, Pa., July 5, 1900: S. B. Luckie, president; M. H. Cryer, first vice-president; G. L. S. Jameson, second vice-president; C. V. Kratzer, recording secretary; V. S. Jones, corresponding secretary; R. H. D. Swing, treasurer. Council, I. N. Broomell, H. S. Seip, Robert Nones (three years); G. L. S. Jameson, M. H. Cryer, H. N. Young (two years); J. A. Libbey, H. C. Register, C. S. Beck (one year). Board of Censors, W. D. DeLong, H. DePuy, J. E. Libbey, J. C. Hertz, C. R. Scholl. Executive Committee, J. A. Libbey, Grant Mitchell, H. C. Register. Legislative Committee, G. W. Klump, J. A. Libbey, H. M. Beck, A. S. Koser, W. E. Van Orsdel. Committee on Enforcement of Dental Law, F. D. Gardiner, H. Zimmerman, H. W. Bohn, D. C. Dunn, Herinan Haupt, C. J. Phillips, C. S. Beck, C. H. McCowan, B. F. Witmer, T. W. Thomas, C. C. Walker. Clinic Committee, R. H. Nones, W. H. Fundenberg, J. E. Libbey. Exhibit Committee, J. T. Lipincott, H. DePuy, W. A. Kessler. Publication Committee, C. V. Kratzer, E. C. Kirk, James Truman. Committee on Ethics, I. N. Broomell, J. A. Libbey, H. C. Register. The first named of each committee is its chairman.

The next annual meeting of the society will be held at Pittsburg, July 9, 10, and 11, 1901.

C. V. KRATZER, *Secretary*,
111 N. Fifth street, Reading, Pa.

NEW YORK ODONTOLOGICAL SOCIETY.

(Continued from page 89.)

THE paper of the evening, written by Dr. WILLIAM HIRSCHFELD, of Paris, France, was then read by Dr. Benj. C. Nash, as follows :

IRREGULARITY OF A FRONT TOOTH CORRECTED BY A
PORCELAIN INLAY.

Miss Clara E., a young actress, came to consult me about her right lateral incisor. This tooth, otherwise perfectly sound and solid, spoiled the whole appearance of her mouth by its crooked position. Turned halfway round upon its axis, it leaned against the central in such a way that the labial and lingual surface formed the approximal sides. The gap between the canine and central was aggravated by the separations existing between all the teeth. The rough sketch herewith will give an idea of the really ugly look of these teeth.

Before going abroad, the patient had seen a dentist in New York, who had advised her either to let it alone, or have the crown cut off and replaced by some kind of an artificial one. The young lady having fully made up her mind to have only the pivoting done, came to me with that resolution.



In examining the case, my fixed idea was to follow the advice of my New York *confrère*, and to insert a carefully fitted Logan crown.

Two great objections, however, presented themselves against this operation:

First. The necessity of devitalizing a sound tooth.

Second. The impossibility of guaranteeing the future crown, no matter how conscientiously done, from accidental breakage.

These objections were presented frankly to the patient, and made such an impression on her mind as led her to give up the idea of a pivot tooth.

Turning the tooth by means of regulating appliances was out of the question on account of the short time of her stay, and finally we thought better not to do anything.

With any ordinary private patient I should not have thought any more about the case; but reflecting on the great importance of well-ranged teeth for an actress, I studied the matter over and finally the idea struck me to reproduce the normal shape of the tooth by means of Dr. Jenkins's porcelain. In doing so the vitality of the tooth would be safe, and the risk of an accident be reduced to almost nothing. All this was explained to the patient at another visit, in the course of which she consented to the operation.

For any practitioner familiar with Dr. Jenkins's method, this case will not seem connected with any special difficulty. But still, different from making an ordinary inlay in a given cavity, it was important in this present case to know beforehand exactly where the future block should be situated. To this end some Gilbert's

temporary stopping was stuck on the tooth, and shaped to represent the inlay to be made. This little detail enabled me to find out precisely where and how much to cut away from the tooth. The part limited by the stopping was then marked by ink on the tooth, and after removal of the stopping the clear outlines were left on the surface. Corundum points, kept well moistened, soon took off sufficient of the enamel within the marked space to complete the cavity by ordinary burs. Great care was taken in getting perfectly smooth edges. The rest of the work was done after Dr. Jenkins's instructions, and a beautiful block, fitting the edges perfectly, was the result. The contours were sufficiently built up so as to reproduce, nearly, the missing part of the tooth. Before setting the inlay, the edge of the lower canine was reduced a trifle to prevent striking, and the block put in place by means of Harvard cement.

A critical eye might have found fault with the color, which looked somewhat lighter than the tooth from the side, but seen from the front, no one would ever have distinguished the limit between nature and art. On the whole, the operation turned out a great success, and may induce others to do the same in similar cases. The principal objection which one may feel inclined to raise is the question, How long will this inlay last? and this point needs a few words of explanation.

It is now nearly three years since I have taken up Dr. Jenkins's method into every-day practice, and the few cases of failure which occurred in the beginning proved simply this fact, that Dr. Jenkins's system to be used successfully requires, above all, the minute observation of every single detail. The conscientious operator who is not afraid to remake an inlay which is not altogether perfect will soon get perfect results at his first attempt. Dentists may say and repeat over and over again that the line of separation between tooth and block will sooner or later cause the loss of the whole inlay. To that I can only say that I have not seen these features except in cases of faulty manipulation.

It is my conviction that with perfect edges the cement—provided it has been permitted to set sufficiently long—will keep the block almost indefinitely in place, and that the whole profession is indebted to Dr. Jenkins for having advanced teeth-filling an immense step toward that ideal which we all of us have in mind.

Discussion.

Dr. R. OTTOLENGUI. This is an operation that I could not indorse. In the first place, the diagram on the board represents simply a plane, a flat surface or what might be considered a section, and the essayist does not say a single word as to how he got the side of a tooth to look like the face of a tooth. The paper said the tooth was turned half, but it was really only turned a quarter according to the diagram. That would present either the distal or the mesial surface of the tooth. The line from the gum-margin to the incisive edge of a tooth, on the mesial or distal surface, is different from what would present on the labial

surface, and I do not see how he could have converted that surface into anything like the appearance of the labial surface, without sacrificing considerable of the enamel, unless by a strange fortuity it was turned so that the point was within the line of the arch. In either case, to have turned that tooth and converted it into anything like a natural tooth there must have been a denudation down to the dentin at the incisive edge, and if you leave the tooth in that condition you will perform an operation which necessarily would be an extensive one. I do not see why the patient should not have the more permanent operation of a crown at once. This person is an actress, and consequently I think she was an adult, and therefore the pulp of the tooth was of no advantage. In consideration of the cosmetic advantages I think it might have been devitalized. I do not think that, after all, Paris improved so much on the advice the lady received in New York in regard to having a crown made at once.

Dr. HEAD. If an actress did not have the time to have the tooth rotated, I should be tempted to let her wait, hoping she *would* have time in the future. But if such an operation were advisable, and my friend Dr. Hirschfeld is certainly a most competent judge, I can only applaud the admirable manner in which it was accomplished.

Dr. PERRY. The first difficulty in a case of that kind is understanding it from any description that could be given. If I could stand over the chair and see the case, I would have an opinion probably in a moment; but from the description given, although it may be as clear as it can be given, I can hardly express an opinion. I am inclined to take the view that Dr. Ottolengui expressed. I think a crown could have been put on easily and permanently. Still, I can readily see that an inlay could be placed on such a tooth if the tooth were properly prepared. There was not sufficient description given in the paper of just how the undercuts were made and the inlay put on. If an inlay were to be used, I have in mind the preparation of the cavities so the inlay could be put in something like the Mason crowns.

Dr. N. W. KINGSLEY. The only question in my mind about that operation is its durability,—whether putting patches on teeth like that will be permanent. I have yet to feel convinced that porcelain fillings are going to be as permanent as gold fillings. They may be, but the time has not been long enough to prove it. As far as the appearance of the tooth is concerned, it would be vastly benefited by putting on a porcelain, if that porcelain matched in color and were properly joined. The fact that the color can be matched very well is of great value. The principal objection has been the attachment and the durability of the thing.

Dr. Ottolengui said he thought it would have been better to cut off the tooth and set on a Logan crown. I say No. As long as you can put on a presentable patch, it is better to keep the natural tooth. So long as the appearance is as good as it might be, it is better than a crown. If you have to resort to the pivoting on to a root, you can always do that.

The PRESIDENT. The entire face of the tooth was ground off, and the gold or platinum burnished on and the inlay put on. It is a very simple and easy thing. I did not see that particular case, but one somewhat similar to it. It was not perhaps as narrow as the one shown here, but the entire edge was ground off.

Dr. J. F. P. HODSON. What was the idea of marking it with ink, then?

The PRESIDENT. In order to get an accurate outline. He claims this is half the battle. They ought to be ground down and the gold or platinum fitted to them perfectly smooth. The smoother you can get the margins, the better the inlays are and the longer they will remain.

Dr. R. C. BREWSTER. Since the idea was advanced of putting a crown on, I was thinking whether it would not be possible to extract the tooth and replant it.

Dr. PERRY. I am a great advocate of the implantation of teeth, under favorable conditions and as a last resort, but I would not think of it in such a case as this. I would not take out a healthy tooth like this. While I have had a good many successes, some of them ten or twelve years old, I have also had many failures. A crown placed on that tooth would be so much more scientific and so much better practice that I think it would be preferable.

Dr. OTTOLENGUI. The disciple of implantation who was originally from San Francisco simply rotates the teeth. I saw a patient who went from New York to San Francisco, and wanted some teeth implanted. She had a bicuspid and a molar implanted. She had three bicuspids that were not quite straight, just a little crooked, and the dentist did not like the appearance of them, so he just twisted them straight. It took only a few seconds. They were not extracted, merely twisted.

Dr. HEAD. What I have to say on the subject of inlays is largely a reaffirmation of what I have said before. It has been said this evening that there is doubt as to whether inlays will last, and there is doubt. Even in the light of Dr. Johnson's experience, there is doubt whether gold will last. It depends largely on who does it, and how it is done. I think we have all had failures with porcelain fillings, and I think, with the exception of some enthusiasts, we have all had failures with gold fillings.

The chief point to be regarded in porcelain fillings, as in gold fillings, is to have sharp, hard polished edges, free from any possibility of being powdered. There was a gentleman in Philadelphia who did very good work. He was a teacher of some years' standing. One of his pupils came to him and asked, "How do you fill difficult cavities?" "I never have difficult cavities; I cut them away until they are easy," he said. So, in porcelain work, many failures are due to not cutting away sufficiently. Gold fillings drop out and fail in many instances, because they are not sufficiently dovetailed and undercut, because they do not have sufficient substance to bear the strain; many porcelain inlays fail from a similar cause. The one thing most necessary for

success in porcelain work, is to prepare the cavity to fit the porcelain quite as much as the porcelain to fit the cavity, and if platinum is used, it is especially essential that there should be hard, sharp, polished edges. This can be accomplished easily with wet diamond burs or little Arkansas stones. If the interior of the cavity is formed so as to almost hold the porcelain filling itself, the preparation of the matrix and the packing of the material will be comparatively a minor detail.

What I have said on the subject of the high-fusing and low-fusing bodies, I can but reiterate. I saw Dr. Jenkins this summer in Paris, and we had a delightful time comparing methods. He does beautiful work, and his adaptation is beyond all criticism. I think he also saw that there were advantages in the high-fusing bodies that he had not before recognized. When I was making my matrix he confessed that as perfect a matrix could be made with platinum as with gold, but declared that the result was due to the individual skill of the operator. This, while complimentary to me, was not fair to the method. I also noticed that Dr. Jenkins has been improving his porcelain nearly every year since he has made it, and I have heard a great many people declare that the porcelain does not last. I am perfectly well aware that if the Jenkins porcelain is not properly fused it will not last. The high-fusing porcelain also, if not properly fused, will blacken and undergo changes in color. But I have yet to hear any one find fault with the high-fusing porcelain on account of deterioration in the mouth. If they do, they are accusing themselves, for the high-fusing body has been used in the mouth twenty or thirty years. While it might be possible for Dr. Jenkins to use his porcelain so that it would give permanent results, owing to his care and skill and precision, I have come to the opinion that in the hands of the average dentist, with the average skill that is required to make a good matrix of platinum, the high-fusing body will give better results than the low-fusing body.

THE PRESIDENT. What cement do you use now for that work?

DR. HEAD. I have found no cement up to the present time better than the Harvard cement, but I wish to thank Dr. Jenkins for suggesting that the Harvard cement be ground finer than formerly.

DR. PERRY. I infer from Dr. Head's remarks that he feels that perhaps the Jenkins inlay can be or is a little more accurately adjusted to the tooth than the high-fusing body. I ask to learn if I understand him correctly. I mean only a little more.

DR. HEAD. I admit that the gold foil is more pliable than the platinum foil. The gold can be pushed into place more easily than the platinum foil, and if both were used in the same way and the platinum pushed into place as the gold is, the gold would make a matrix far more accurate. But if the cavity is prepared with good, clean edges, so that there are no more compound curves than cannot be avoided, if the platinum as I have shown on various occasions is then placed over the cavity, held immovably, while it is coaxed into place as far as possible with cotton or

spunk, and if the foil is spun into the cavity by starting at the edges and gradually working to the bottom, a platinum matrix can thus be made quite as perfect as a gold matrix. At first the platinum is soft and pliable, but after it is burnished it becomes stiff and unyielding, which stiffness is an advantage, because it renders the finished matrix of such a springy texture as to make its distortion most improbable. If any one present would like to see me make a platinum matrix and bake it full of porcelain in the presence of a gentleman who thinks he can make a better gold matrix, I should be very glad some time to put the two methods side by side, in order that there might be a scientific demonstration.

Dr. PERRY. Dr. Head has very clearly stated those points, and I hope all appreciate that fact. There is much more heat necessary for the high-fusing body. How much more change in shape of the porcelain do you see on account of that heat?

Dr. HEAD. There is almost no change in the porcelain. The high-fusing porcelain is made of large and small particles, and the large particles do not melt, but the small ones fuse and flow together in such a manner as to make the larger grains form a fine contour. I would also speak of something else that came to me when Dr. Perry was speaking of the anchoring of inlays. I was reminded of a certain horse-thief out West, who said whenever he stole a horse he made it a point to ride away as fast as he could for two days until he was so tired that he could ride no farther; then he went on six hours more. In the same way, speaking of undercuts, first make as many undercuts as you can, and then make a few more. I have yet to find any difficulty in making undercuts, even in a filling the size of a pinhead. The porcelain and the copper disk charged with diamond dust should be dipped in water; then the edge of the filling should be buried in the skin of the hand, and the swiftly revolving disk will cut the porcelain and push away the skin without injury to the fingers. It is easy to accomplish. When I have undercut my porcelain, I dip it into ninety-five per cent. alcohol, and then put it on a napkin while I am putting on the rubber dam and drying the cavity carefully, and I must say, in passing, that it is better to put on the rubber dam whenever one can, as the cavity cannot be too dry. The greatest adhesion is obtained by the greatest dryness. In putting in the inlay, it is always best to place it on the operating case in the relative position it would take in the cavity; then the cavity can be filled three-quarters full, and the filling picked up on a sticky spatula and put into place. A little strip of tape is also valuable for working it into position. It gives sufficient pressure, and there is no danger of breaking the inlay, which is to be feared when one uses wood or a metal instrument. I have noticed that the tape not only pushes it into position, but has a way of settling it so that the right end of the porcelain will always slide accurately into the proper grooves of the cavity.

Dr. OTTOLENGUI. Do you have any trouble from staining the porcelain with the copper disk?

Dr. HEAD. The copper will not come off if it is kept absolutely wet. A person once told me his furnace never burned out, but if it did, there was another muffle to put in. I also will say that it never does stain, but if it should, it is due to the fact that there is a slight porosity in the filling underneath, and if the filling is held in the hand and a sharp, small stream of water is squirted directly on the porous place the black particles will be washed out.

Dr. OTTOLENGUI. Where I have had the stain from the copper, I have had no difficulty in getting rid of it by using a very stiff engine brush-wheel, just rotating it.

Dr. PERRY. I have not been so successful with the copper disk, and I used it in the beginning quite faithfully, both wet and dry. Most of the inlays we set are very porous compared with the old-fashioned teeth, such as Dr. Kingsley used to bake. I had occasion, some years ago, to put in a set of continuous-gum teeth made by Dr. Close. The patient complained of an odor, and I insisted, in my young way, that it could not be possible, and it was not right for her to make such a complaint; but I know now that she was right and that the porcelain was not well baked. There was a gloss over it, but it was porous, and could absorb and be disagreeable. Many of our inlays are porous, and if the color from the copper wheels gets into them, it is very difficult to get it out. I have had little disks made with the white rubber, so that does not happen now. They are as thin and will cut as narrow a groove as any copper disk I remember to have used.

What is Dr. Head's experience or report in regard to the light-color porcelain in preventing discoloration?

Dr. HEAD. I have found in setting inlays between teeth that we are apt to be deceived at first by the fact that the inlay looks darker over the fresh cement than it eventually will be when the cement sets. When we cement inlays into place, if they look well at the time, they sometimes, from this cause, look a little too light afterward, and sometimes when we have made them a little too dark, the cement, when set, makes them of the proper color. While the approximal fillings do turn black and need some of the white material to bring them to the true color, I should say, if I have made any mistake, that I have up to this time been putting a little too much white, rather than not enough. The white is valuable, but we must not make the filling too white, or it will be almost as unsightly as when it is too dark.

Dr. TRACY. Did Dr. Head understand Dr. Perry thoroughly? I think Dr. Perry meant the preparation made by the Consolidated Company, known as "anti-shadow."

Dr. PERRY. I had reference to what Dr. Head brought before the profession.

Dr. HEAD. What you mean is a colorless high-fusing body that will not fuse at all, and is intended in large cavities to be a sort of internal investment. The color must first be mixed to match, then into this mixture one-quarter or one-fifth of high-

fusing body should be added for the first baking, when these particles will form long chains across the matrix, so there is very little chance for the distortion. The anti-shadow porcelain is made with oxid of tin, and is so dense and so white that it seems to counteract the shadow. Even one-quarter or one-fifth will be sufficient to restore the color of the tooth when the color has been lost by this shadow.

Dr. PERRY. I do not know whether I am correct in my observation, but I have felt that all the inlays change color after a while. You have seen implanted teeth that were very different from the adjoining teeth. After a few weeks or months they become like the adjoining teeth. I think inlays improve in color. I have noticed it in inlays I have placed that were not altogether satisfactory; after a few months they look very much better.

Dr. KINGSLEY. Does that apply when the inlay is too light, or too dark? Does it apply in both cases,—where the porcelain filling is lighter than it should be, and where it is darker?

Dr. PERRY. My observation is that the lighter ones will grow a little darker. I do not think the darker ones will grow lighter.

Dr. HEAD. I have noticed that the porcelain inlays look much better when the line of cement has disappeared, and that porcelain fillings that were at first not altogether satisfactory, became much better in the course of two or three months. I have also noticed that when these improved fillings were polished off they did not look quite so well. This discoloration, therefore, is partly surface discoloration and comes from the mouth, except perhaps in such cases as Dr. Rhein mentions, where the mouth can go a whole year without cleansing or polishing.

Dr. OTTOLENGUI. With reference to the porcelain of Dr. Jenkins changing color; we have no right to judge of what happens to porcelain that is improperly handled or improperly baked. With the statement Dr. Head has made I agree, that many of the failures or changes are due to improper baking. About a year and a half ago I made a corner for the lateral incisor and set it, and at the time I regretted that I had not built it out a little more. Subsequently I put in five or six approximal fillings for that patient. Her teeth were all of the same color, and the fillings made from the same batch. After the work was completed, which took some time, because it was not done with close consecutiveness, I became more and more dissatisfied with that corner of the lateral incisor. The patient came to me again this fall, and I took that corner out and made a new one out of the same body, and I took the pains to compare the new inlay with the one worn in the mouth for a year and a half, and there was, as far as my color value goes, absolutely no difference in the color of those two inlays. I have not noticed any changes whatever in the inlays, and I have had a good opportunity to judge in the mouth of a gentleman for whom I have been putting in inlays for many years, the first ones having been made of the low-fusing glass German body which we had prior to the Jenkins material, and which I did take out after they had been in only a

year, because of the crackled appearance, and little black lines and bad discoloration. Those have been taken out and replaced by degrees with the Jenkins body, and I have had absolutely no further trouble with discoloration. I think there are eight in his mouth now, and the Jenkins body does not seem to discolor. I think that, with all the bad things that are said about the Jenkins body, it is not fair to say it discolors, any more than that gold fillings discolor.

Dr. KINGSLEY. All the porcelain that is used in the manufacture of teeth in this country is porous to a certain extent. You may test it by exposing them to a higher heat than that which has fused them, and you will see how much smaller they get, how much more dense. What has become of the material? It has not been lost. It has been drawn together. The variety of teeth now in the market is partly due to that fact. A little more or a little less heat changes both shape and color, and that gives that enormous variety of which we are now able to avail ourselves. The Ash teeth are more dense than the American teeth, there is not so much shrinkage to them; but the porcelain teeth of this country are more or less porous, and absorb when worn long in the mouth. What they absorb I do not know, but they become more mellow and are improved in appearance.

Dr. HEAD. I think it depends a great deal on the way in which it is put in the matrix. Sometimes it draws away from the matrix, and sometimes it shrinks toward the bottom. Dr. Kingsley has said that the porcelain in this country is porous. I have no doubt he recognizes that the difference between porcelain and glass lies in the fact that glass is one transparent, homogeneous structure, while porcelain is made of unfused particles held together by those that have fused. Thus, if the spaces between the unfused particles are not absolutely filled by the smaller particles that do fuse, a certain amount of porosity results. The authorities recognize that even the porosity of the high-fusing bodies does not cause it to change color much, and that this porosity tends to make the tooth less likely to crack. Up to the present time, with the exception perhaps of the Jenkins body, no low-fusing body has been put upon the market that will withstand the action of the saliva.

Adjournment.

W. J. TURNER, M.D., D.D.S.,
Editor New York Odontological Society.

ANNUAL CONVENTION OF THE SEVENTH AND EIGHTH DISTRICT DENTAL SOCIETIES OF THE STATE OF NEW YORK.

(Continued from page 1329, vol. xlii.)

FIRST DAY—*Afternoon Session* (continued).

FOLLOWING the discussion of Dr. C. C. Bachman's paper on "Dentifrices" (see December, 1900, issue of the DENTAL COSMOS),

Dr. W. W. BELCHER, Rochester, read a paper, of which an abstract follows, on

THE CULTIVATION OF THE POSITIVE.

Positiveness does not imply crankiness. A man may be quick, silent, and full of decision, and yet be a gentleman. "All the world loves a lover," but also let it be said they love a positive character, even though they may not agree with him.

In practice be careful and examine each case thoroughly before expressing an opinion; but having expressed it, do not lightly change. Avoid, if possible, explanations. You may desire to change your procedure, and this will involve a new explanation and the loss of the confidence of your patient. This is especially applicable to regulating operations.

"To what do you most attribute Dr. Blank's success?" I asked a gentleman who had been closely associated with him. "Largely to the convincing way in which he says 'Fifteen dollars.' It leaves the patient no chance for argument," was the reply. Gentlemen, there is something in this. Once having set a fee for services rendered, stick to it.

When you make a request of a patient, make it "the Queen's request." If you find it necessary to issue a prescription, ascertain at the next visit of the patient whether the prescription was followed; and if not, why not. If you find the use of milk of magnesia is indicated, do not say it would be a good thing to use; order its use. Impress the patient with the fact that his teeth are going straight to destruction if he does not follow your advice.

Always give the patient a card with the day and the hour. If she makes her appearance at four o'clock when her card reads "three o'clock sharp," do not wait on her, even if you have an abundance of leisure and four o'clock is a better time than the time appointed. Give her a new card with the information that "three o'clock" means just what it says, and that the next broken engagement means a charge for time lost. Of course, if the car broke down or the baby had convulsions accept it as an excuse,—it may be true,—but make a new appointment.

In the treatment of children always be absolutely truthful. A great point is to have your patients, especially the small ones, rid themselves of the idea that they are to be killed. How many times do we see patients holding themselves under a strain, expecting every moment to be called upon to endure excruciating pain. After the patient and myself are somewhat acquainted I say to him, "Now, I am not going to hurt you yet; before I begin to hurt you I'll let you know, and you can get ready." I then proceed with the preparation of the cavity. Perhaps a chisel is used to break down the enamel,—much noise but little pain. If I see the patient is still under a strain and acts as if every minute is to be his last I stop and say, "Did that hurt you?" "No." "I thought not." To put him more at his ease I say to him, "Did I ever tell you an untruth? Now, I mean just what I say; it is not going to hurt. If you do not believe this I'll think you have no confidence in me." When the time comes when I know I must cause considerable pain I tell him to get ready, and I find that even a small child will bear with comparative willingness a considerable degree of pain if he is

assured that it will soon be over and that it will not be more than he can endure.

In conclusion, I believe every man can make his practice whatever he pleases. If he shows a lack of decision,—trouble and vexation without end. If he be kind, sympathetic, and positive,—a pleasure. It lies with him to make it his own heaven or his own hell.

Discussion.

Dr. FRANK FRENCH, Rochester, said positiveness is one of the best adjuncts a professional man ever had. He has use for it all the time. In dealing with children we should of course be positive to gain their respect, and truthful that their confidence in us may be preserved, as they are our patients of the future.

Dr. F. H. LEE, Auburn, was pleased with Dr. Belcher's paper, and agreed with him in dealing strictly with the truth in practice. But as to being too strict in the matter of broken engagements, it would not always do. He had had an experience of sending a patient home for not being on time to keep an engagement, and in consequence lost the patient. When it is possible, it is better to accept the situation, but try to impress upon the patient that it must not happen again.

Dr. F. W. Low, Buffalo, then read a paper on

THE HISTORY OF THE ANTIQUITY OF SANITARY FUMIGATION.

The essayist illustrated his topic by burning incense, pastils, joss-sticks, etc.

He claimed that fumigation for sanitary purposes, or purposes of purification, antedated the pyramids, and that its religious use symbolized purification based upon the knowledge of the disinfecting properties of the substances composing the incense. Sulfur as a disinfectant was well known to the ancient Egyptians, and used in embalming. Ulysses also used it, as related by Homer, to purge his dining hall, to cleanse it from the pollution of the blood of the slaughtered suitors. His conclusion is that the modern methods of disinfection, until the introduction of formaldehyd, were not very far in advance of those used occasionally thousands of years ago.

There was no discussion on Dr. Low's paper. and H. B. HUVER, M.D., D.D.S., Buffalo, read the following:

DRY SOCKETS.

Definition.—By the term dry sockets is meant no appreciable amount of bleeding after the extraction of a tooth, several teeth, or their roots, and a continuation of this condition until remedial or surgical interference is required. In a description of this condition by Dr. J. Y. Crawford he so called it, and, as far as your essayist has been able to ascertain, no other name has been given to it.

Etiology.—In no part of the anatomy is any portion of the osseous system so exposed to the surfaces or less protected from injury than just beneath the festoons of the gums. Or is there any bone containing a cancellous portion of any amount but that has a much thicker and stronger compact portion as an external protection.

To convince ourselves that the periosteum of the alveolar process is very susceptible to systemic and blood conditions we need but to recall its numerous pathological diseases, and the severe action of the many drugs causing many of these afflictions.

This condition occurs from any and all teeth of both maxillæ, but its most frequent occurrence is from the lower teeth, and more especially those posterior. It occurs at all ages in both sexes; in the robust and emaciated; in the plethoric and anemic. Were this condition to occur only in teeth afflicted with abscess on some portion of their roots, or pulpless teeth, the solution of the cause would be easy; but it does occur from teeth which are seemingly in a normal state. But to the essayist's mind a solution seems clear in that either not enough or else too much periosteum has been removed.

Pathology.—By the cases spoken of as not enough removed are meant those afflicted with active, chronic, or aborted abscesses, or some previous or present pathological condition of the pericementum, by which it becomes detached or partially loosened from the root, which, upon being removed, allows of its remaining within the socket, the abscess being surrounded by the prophylactic membrane, or else the pericementum being so thickened and hardened as to admit of no bleeding.

By the cases where too much is removed is meant that all membrane covering both root and living sockets is torn away, and by its removal leaves a denuded osseous surface of considerable density, which, of course, will not bleed, but does pour out a thin serum in slight amount. Or else some pathological cause, as pericemental abscess, pyorrhea, or serumal deposits, may have previously divested the alveolus of its periosteum, the tooth being retained merely by its shape.

* *Symptoms.*—Lack of bleeding from the first, with the possible exception of a slight amount from the gum-tissue, the entire socket remaining open and exposed to the air and saliva for a variable length of time, even as long as a year in some cases; severe pain, increasing in intensity as time elapses, it often being necessary to resort to some general analgesic; swelling and congestion of the gums in the surrounding area. All the signs and symptoms of inflammation appear in their regular order,—gangrene of the soft tissues, absorption and possibly necrosis of the process.

Prognosis.—This is favorable under most conditions and upon immediate treatment.

Treatment.—Care should be used to see that no foreign material gets into the socket, such as pieces of salivary calculus or portions of food following emesis; that no portion of any roots remain; that any portion of surrounding fractured alveolus is removed. If pain is immediate try pressing together the external and internal plates of alveolus surrounding the adjoining teeth, as frequently it is sprung away, exposing their pericementum. In the cases where there is remaining abscess or thickened membrane, scrape or bur out thoroughly; frequently interspersed with syringing out, using exceedingly hot antiseptic solutions, no difference how strong, as

long as the pericementum still remains. This procedure will invariably start bleeding, which is the principal factor, after having been sure to remove all possible source of future infection. Do not allow strong germicides to remain in the cavity, but rinse out thoroughly with sterile water, and be sure to start fresh blood from the periosteum as the last thing. In the cases where the periosteum is entirely gone rinse out with mild and soothing antiseptics. As the hard bone will not bleed, cut away until it does bleed freely, being careful not to go down so far as to enter the inferior dental canal. If no result is obtained drill through to the periosteum of the surfaces of one of the plates, as your judgment suggests, near the bottom of the socket, so that when the granulations form they will have a future source of nourishment; as blood derived from the mouth of the socket will contract upon coagulating, and draw away from its source of supply, making it merely a plug of foreign material, which will soon break up and wash out, leaving a worse condition than at first. In those cases where the orifice of the socket does not fill readily it must be protected from the air and saliva, which are the sources of the pain. We have tried many preparations for this pain, but in the last few cases under treatment have used a gauze packing saturated with a mixture of orthoform (which is both antiseptic and anesthetic), balsam of Peru, and olive oil or lanolin with most satisfactory results. This packing is to be gently pressed into and over the partially blood-filled socket. Great care should be exercised in not having too much packing and only going to the clot, for if too much is used it will compress the clot, or else become so entangled in the meshes that when it is removed it will carry away the newly-formed granulations. If, when the packing is removed, there is no fresh bleeding, gently pick at the new granulations until they bleed. By following this method it is but a short time before the socket will be filled to the gum-tissues, which should be scarified that union may proceed more rapidly. The essayist has tried to confine himself to the subject under consideration, and not dwell upon the serious results sometimes caused by this condition, as they are another story.

Discussion.

Dr. F. W. Low, Buffalo, said the paper was very interesting to him, because he had been taught at the New York College of Dentistry that an extraction is incomplete unless the socket was syringed with hot water, carbolic acid, and glycerin. He had never had but one patient with this condition of dry socket. In that case there was no bleeding, and pain was very severe. The patient went to Dr. Roswell Park, who packed the cavity with gauze, and in a few days the trouble ceased. He always syringed the socket out after extracting the tooth, as he thought this would prevent hemorrhage afterward.

Dr. W. A. BARROWS, Buffalo, asked those present who made a practice of syringing out all sockets after extraction to raise their hands. (About one-third of those present showed their hands.) He thought the practice was not common unless there was some

pathological condition, but thought it should be perhaps invariable, certainly when there had been any ulceration.

Dr. Low asked how frequently this condition of dry socket occurred. He thought possibly he had escaped it in his practice, because, as he said, he always syringed out all sockets after extraction, though this was done with the idea of preventing hemorrhage, and not with any thought of dry socket.

Dr. L. MEISBURGER, Buffalo, said he had a case of this kind in his practice which he thought was due to the low physical condition of the patient. He tried to induce bleeding by the use of hot water, and the pain finally ceased and the socket filled up.

Dr. C. S. BUTLER said he had seen several cases of trouble from dry socket; one in which a physician had extracted several teeth. There was very little bleeding after the operation, and the pain was severe for several days,—so severe, indeed, that it was necessary to keep the patient under the influence of opiates. In all such cases he uses carbolic acid and hot water to bring on bleeding, and the carbolic acid acts also as an antiseptic. He commended Dr. Huver for having brought the subject before the convention.

Dr. C. W. STANTON said he was hearing repeated reference to the use of carbolic acid as a disinfectant. He would like to hear from Dr. Peck as to whether it was a disinfectant or not.

Dr. A. H. PECK, Chicago, said in former years we looked upon carbolic acid as a disinfectant and germicide, but now we know that it is only a restraining agent, restraining the spread and effect of sepsis. The length of time it will restrain the germs of infection depends upon the amount of carbolic acid in the culture-media. An increased quantity will prevent the growth of the germs for a longer time, but almost invariably the germs will recover and continue to develop. He had made many tests, with a view of determining its value as a germicide, and can say positively that it does not possess the powers in that direction that we at one time thought it had. As a local anesthetic, however, it has great value.

Dr. Low said he had recently heard a lecture on toxins and anti-toxins by Dr. Clewes, in the course of which it was shown that although carbolic acid was not an antiseptic in a test tube, that it would be useful as an anesthetic in living matter. The lecture showed us that micro-organisms produce a certain exudate, which is the ptomain, and that the white blood-corpuscle sends out a certain exudate that has an affinity for this exudate of the micro-organism, and they unite in a combination that is innoxious. Thus, though carbolic acid is not an antiseptic in a test tube, it may prove an excitant to the blood-corpuscles and cause them to throw out more of this exudate, and thus act as an antiseptic in practice.

Dr. PECK said that he had not said that carbolic acid did not have value as an antiseptic. It certainly does possess some value, but certainly not so much as we have in the past credited it with. In the test tube it has no value at all, and so it is with iodoform; while in actual practice both have real antiseptic power. My statement was that carbolic acid is not the powerful antiseptic that we formerly believed it to be.

Dr. HUVER, in closing the discussion, expressed his gratification at the fact that his paper had been received with such general interest, and had evoked such a full discussion. These conditions are rare, but do occasionally occur; and when they occur are exceedingly troublesome. As to washing out sockets after extraction, he did not think it useful except under pathological conditions.

Dr. Low asked how he accounted for the great pain when there was a dry socket.

Dr. HUVER said he thought the pain was caused by the exposure of the bone to the air and to the saliva. Covering the bone with blood coagulum prevents this exposure.

Dr. BUTLER said he believed that blood is the best natural germicide of which we know.

The subject was passed, and the convention adjourned until 8 P.M.

Evening Session.

The convention was called to order at 8.30, and the following paper, by C. M. POST, M.D., and W. W. COON, D.D.S., was read:

A REPORT OF "BUZZ-SAW FRACTURE" OF SUPERIOR MAXILLA.

BY C. M. POST, M.D., AND W. W. COON, D.D.S.

(C. M. POST.) On November 29, 1899, I was called in a great hurry to see Mr. B., a young man aged twenty-five, who had been hit in the face by a piece of a circular saw which had broken while in motion. The young man lived about three miles from town. I hurriedly made preparations to accompany Dr. S., their family physician. We arrived at his home in a short time, and found the young man in a state of collapse, having one of the most ugly wounds in his face that it has ever been my fortune to see.

It seems that he was feeding the saw, when in some way it kinked and broke while in motion and a three-cornered piece about five inches long and three inches wide at the base struck him in the face. At the time of the accident he was about a mile from home, and he had been carried home by the time we arrived. I mention this simply to show his extreme vitality, which proved so important a factor in his final recovery.

When we arrived he was found, as before stated, in a condition of collapse. And without more than glancing at the wound I immediately prepared for hypodermic injection a solution containing strychnin sulfate one-twentieth of a grain and morphin sulfate one-half grain, which I administered, together with three or four drams of brandy, also given hypodermically.

As soon as possible we improvised an operating table, and, getting the patient upon it, we examined the wound and found a most frightful gash extending from about an inch above the left eye obliquely downward to the right across the nose and upper lip and upper jaw, cutting both the latter in nearly the median line. On examining more closely it was seen that the metal had cut into the frontal bone to the frontal sinus, cutting through the orbital ridge and the eye; cutting through the superior maxillary on the

left side, through the antrum of Highmore, and even through the floor of the cranium, so that by springing the bones apart a little the brain substance could be seen. The incision then extended through the nose, splitting it just to the right of the septum at the external opening of the anterior nares, cutting the lip near the median line, also the hard palate, fracturing this along the line of articulation. The piece of saw struck the face with sufficient force to loosen both superior maxillary bones from their articulations above; so that both bones were movable vertically as well as laterally to some extent. The external wound was about four and one-half inches long, and of sufficient size that all four fingers could be introduced together about the full length of the fingers. The patient rallied a little from the effect of the hypodermic injections, and after Dr. S. had given him a few whiffs of ether I proceeded to clean up the patient preparatory to closing the wound.

My first work was an attempt to tie the central incisors together, but the teeth were so conical in shape that the ligatures would slip off, and hence it was unsuccessful. While I was thus working he collapsed again. The pulse became very weak, and the respiration became very interrupted,—a typical Cheyne-Stokes respiration. It seemed as though he would die very soon, and I again resorted to the hypodermic medication, giving him another one-twentieth of a grain of strychnin and some more brandy. His condition improved but little, and I remarked to Dr. S. that I might as well continue suturing the wound, as that would save the undertakers as much work. As he agreed, I sutured the wound with a few deep silk sutures, drawing the two halves of the fractured upper maxillary together with a couple of sutures through the fleshy parts beneath the upper lip. This, of course, didn't hold the fracture tightly, but I thought it would be good enough for a dead man. As the patient was still alive, we applied a dressing and put him back in bed and left for home, expecting nothing different but that we would hear of his death in a short time. He, however, failed to meet our expectations, and rallied after a short time; so that the next day he was conscious, and gradually recovered.

You will remember that the only way in which the two parts of the fractured superior maxillaries were held together was by two sutures through the soft parts above the teeth. This, of course, was not sufficient to hold the parts at all firmly together, and so after a few days—in fact, just a week after the injury was received—Dr. W. W. Coon was called in to see the case, and joined the fractured parts together in a manner which will be described by him.

Bands and Bar Splint (W. W. COON).—The incisors were firm in their sockets, the fracture being exactly on the median line, without injury to either central. The superior maxillaries could not be brought into perfect apposition by reason of the time elapsed since injury, but could approach one another so nearly as to make but very slight space between the centrals. I took to the patient's house a large jeweler's alcohol lamp, a mouth blow-pipe, German silver band metal, and heavy German silver wire. Bands large enough

to include the central and lateral of each side were made from wire measurements; not fitting with perfect accuracy, but large enough to allow some motion in adjusting, which is important to best adaptation of parts at the time of cementing the finished splint.

The bands were placed in position, the fragments brought into relation, and a heavy wire, slightly bent to required shape, laid on the labial surfaces of the bands for marking bands and bar in places to be soldered. After soldering the pieces, the splint was adjusted before cementing, and any discrepancy in form corrected.

The bands are of sufficient size to require quite an amount of cement, and in placing in position the slight looseness of bands allows some motion of the fragments; so that when brought into relation the fragments and splint must be held firmly until the cement is quite hardened.

After placing the splint there was a looseness manifest upon occlusion, or lateral pressure from either side of the whole superior maxillary region "en masse." But at rest the integument and antagonizing muscles held the fractured mass in reasonably good position. There seemed to be a slight depression of the maxillary tuberosities, but upon occlusion all teeth were brought into right relation. And bandaging the jaws together was thought inadvisable, as, if slight deformity resulted upon recovery, which was still very questionable, it would be more than compensated for by the free use of the mouth in irrigating and caring for the injured parts.

I did not see the case again until he walked into my office for examination.

The jaw is perfectly solid, and externally no trace of jaw deformity is noticeable. Occlusion is sufficient for good mastication, the only defect being a slight deflection of the median line to the right. He had been most comfortable lying on his left side, and this predominating pressure had moved the whole upper jaw slightly.

At the present time he is able to work on his father's farm, and says he feels almost as well as before; which is most remarkable, considering the shock sustained. Perhaps this shock was materially less potent by reason of a depressed mentality consequent upon sustaining a fractured skull from a horse kick when a very small lad.

I think the best way to guard against the slight deflection of median line and to hold such an injured mass in absolute relation would be to supplement the splint used in this case with a plaster bandage skull-cap, from each side of which a strong wire should be attached to the splint cemented on the teeth. This could be formed so that it would occasion no discomfort, excepting the presence of the plaster bandage skull-cap.

Discussion.

Dr. W. A. BARROWS, Buffalo, asked how long the splints remained in position.

Dr. COON said about two weeks. The patient was able to masti-

cate soft foods almost immediately. The upper jaw was not immovable while the splint was in place, but now it is quite firm, and, as he said, there is no deformity of the face apparent except when the mouth is open; then it can be seen that the median line is slightly to the right of the middle of the face.

Dr. H. A. PULLEN, Buffalo, said fractures of the upper maxilla were very rare, while fractures of the lower maxilla were comparatively common. He had never seen so extensive a fracture of the upper jaw as that described in the paper. The method by which it was reduced was open to criticism; in fact, Dr. Coon had criticized it himself. The addition of the head-gear would have been an improvement. In case of fracture of the lower jaw the upper jaw acts as a splint, and will preserve the occlusion. He thought the lower jaw could have been used for the same purpose in this case, and the patient fed on soft foods until union of the parts was complete.

Dr. H. B. HUVER, Buffalo, complimented Dr. Coon on his report of the case. He thought the proceeding described was better than using the lower jaw as a splint, as it would have been impossible to keep the fractured jaw in place and quiet while the bones were uniting.

Dr. COON said he did not think that union of the parts could be expected with any method of treating in less than two weeks, the time the splint was kept on in this case; nor that a more favorable result would have been probable.

Dr. W. C. BARRETT, Buffalo, said there is one thing about fracture of the jaws: the bones are so vascular that the broken parts unite more quickly than do the bones in any other part of the body. Where there are teeth in the mouth the practice of wiring them together has superseded all other means. Take any kind of wire and twist it around the cervix of the tooth and then about the opposite tooth, and draw them together. There are few cases where there are a sufficient number of teeth, however. We used to think it necessary to make a place through which to feed the patient. We opened the mouth and took out a tooth for the purpose, but it is not necessary. Just fasten the jaws together, and let the patient take care of the feeding with liquid foods. There will be no great difficulty. Usually by just fastening the teeth together the bones will unite, and the occlusion be restored. Treated in this way, it becomes a very simple matter.

Dr. PULLEN spoke of a case he had treated in Cleveland. The patient was an American, who in a drunken row got his jaw broken by a blow. It was broken at the symphysis. The right side of the lower maxilla was raised about one-eighth of an inch higher than the left side. After working about one hour and a half he succeeded in reducing the fracture by wiring the teeth together, and the result was all that could be desired.

Dr. HUVER asked whether it would be considered advisable in a case such as Dr. Coon described, where the upper maxilla was broken loose on both sides, to wire it to the lower maxilla.

Dr. COON said it would have been impracticable to wire the jaws

together, because access to the mouth was absolutely essential to the care of the extensive wound of the mouth.

The subject was passed, and Dr. J. F. CAPON, of Toronto, read his paper on "Some Practical Details of Inlay Work," which has already appeared in the DENTAL COSMOS (see page 1320, vol. xlii).

SECOND DAY.

The *morning session* was given up to clinics (of which a report will be given later).

Afternoon Session.

The convention was called to order at 2 P.M., and the following paper, by C. H. NICHOLSON, Rochester, was read:

SOMETHING MORE ABOUT PROTARGOL.

In October of last year, at the union convention of these societies in Rochester, a paper was presented by the writer under the heading of "A New Treatment for Empyema of the Antrum," afterward published in the DENTAL COSMOS, December, 1899.

For the benefit of those who were not present at that meeting, and to make the points of the present paper clearer, permit a brief recapitulation:

First. That you may all become familiar with this preparation, let me repeat what was said of its nature: "Protargol is a silver proteid; a yellowish light powder, easily soluble in cold or warm water, forming a brown liquid, dark, according to strength; of neutral reaction, and unaffected by exposure to air, heat, or light. It is somewhat similar to argonin, but differs in that it contains twice as much silver as argonin (8.3 per cent.) in firm organic combination, and is not precipitated by albuminous or sodium chlorid solutions; has extraordinary penetrating power, and is non-irritating." This last feature is especially desirable, permitting its free use about the mouth without fear of unpleasant results. Solutions of almost any strength necessary may be used. From one-quarter of one per cent. to twenty per cent. solutions have been used in genito-urinary diseases, one to five per cent. in ophthalmic, and five per cent. in auricular diseases. For my purpose I have generally found from seven and one-half to ten per cent. sufficient. Fifty per cent. is a saturated solution.

Second. I wish to refer briefly to the case reported in my previous paper as cured in two applications of protargol, and in justice to myself and the drug state this turned out to be not exactly correct, although at the time the paper was presented the young man had received but two treatments and the discharge had stopped for several days. I considered such remarkable results too good to keep, and hastened to let the profession have the benefit of my experience. I have found, however, after a short time a slight discharge reappearing.

Dr. Jas. Pedersen, in a paper read before the New York Medico-Surgical Society, April, 1898, on "The Treatment of Acute Urethritis in the Male," states, in giving his experience with protargol, that he has seen the gonococci disappear from the pus

in two days and then after a period reappear. In another case reported the germ was found absent after four days, but, according to his and others' experience, this condition was not permanent, the discharge reappearing after a few days.

"Similar relapses," he says, "were well-known features under former and older methods of treatment, and were the sources of much dismay to the patient and vexation to the physician if it so happened he did not know the explanation,—the coming to the surface, so to speak, of the gonococci from the deeper layers of the mucous membrane, to which they had penetrated during the period of incubation."

It was to this cause I attributed the relapse in the case referred to. The treatment, however, was renewed, gradually decreasing the strength of the protargol solution from ten to seven and one-half and five per cent., applications being made at frequent intervals (two or three times a week), when, after a period of about fifteen days, the discharge having entirely disappeared, I pronounced him cured.

Two other cases of antrum trouble have since come under my care, the first somewhat similar to the one referred to above, but on the left side, which yielded readily to the treatment. The case was dismissed in about three weeks. The second was somewhat peculiar, and I will refer to it more in detail.

A young man, a deaf mute, was brought to me in May, 1900, with an aching lower left first molar. After preparing the cavity for filling I made, as is my custom, a general examination of his teeth, and found among others the upper right second bicuspid and first molar badly decayed, and above them a large swelling, which presented to the finger two ragged bony crests, caused by the bursting outward of the exterior plate of the superior maxillary bone, between which could be felt a mass more like a tumor than an abscess sac, it was so solid. I immediately extracted the two affected teeth, but was unable to gain entrance to the antrum, and so drilled through, making a large opening, when there discharged about six ounces of brown oily fluid, which had not much the appearance of pus, but, being put under the glass, proved to possess the elements of true pus. After washing out, an examination of the antrum did not disclose any denuded surfaces, nor was the membrane painful to the touch of the probe, which could be plainly felt against the finger through the opening referred to in the exterior wall of the maxilla above the process.

Strange to say, the young man had experienced no pain nor other symptoms, and was entirely unconscious of his condition; nor were there at that time, or any other during the progress of the treatment, any temperature or other systemic disturbances. How long it had existed I had no means of finding out. I instituted the same treatment as in the previous cases,—namely, thoroughly washing with sodium chlorid solution, pyrozone (three per cent.), and protargol (ten per cent.), packing the antrum with iodoform gauze. After the third treatment the gauze packing came out saturated with regular pus, which gradually became less.

Early in June the school the young man was attending closed, and he went home, the discharge at this time being scarcely noticeable. I referred him by letter to a dentist in the city where he lived, who in turn referred the case to a medical specialist. A letter received from this gentleman stated that he had continued the treatment outlined in my communication for a short time, until the discharge stopped, and dismissed the case. Since the young man's return to school I have examined him, but found the parts entirely healthy, and the opening, which was a large one, gradually closing up. It is now covered by a partial denture.

In the paper of last year belief was expressed that protargol would be found very useful in alveolar abscess. Since that time I have experimented with protargol in such cases, and have come to use it almost exclusively, considering it more reliable, rapid, and far safer than carbolic acid or chlorid of zinc.

I have chosen for purposes of illustration the first thirty-five cases from my book, which include alveolar abscesses in incipient, acute, and chronic stages; some blind, and others having fistulas, as well as putrescent pulps and roots. I will cite a few, give you the average of the whole lot, and leave you to draw your own conclusions.

Case No. 1.—Left lower first molar. Incipient abscess; very painful. Cured in five treatments and filled.

Case No. 2.—Right upper first molar. Putrescent pulp. Cured in three treatments and filled.

Case No. 3.—Lady from out of town. Right upper lateral abscessed. Found root perforated on distal side. Cured in two treatments. Packed red gutta-percha in perforation, and put on Logan crown.

Case No. 4.—Left upper first molar. Acute abscess. Received four treatments and filled.

Case No. 5.—Left lower first molar. Abscess with fistula. Had no protargol prepared, and gave first treatment with carbolic acid. Received five additional treatments with protargol, making six altogether, and filled.

Cases Nos. 6, 7, and 8.—Right upper first bicuspid, central, and left upper canine. Putrescent canals. Received three treatments each, and put on bridge-work.

Cases Nos. 9 and 10.—Right upper second bicuspid. Putrescent. Received eight treatments and filled. Left lower first bicuspid. Abscessed. Cured in seven treatments and crowned.

Case No. 11.—Same mouth as Nos. 9 and 10. Left upper lateral. Had been swelling and discharging pus at intervals for a number of years. On entering through the gum over the apex of the root I found a cavity formed in the process as large as a small chestnut. A hopeless case from the start, and after treating a few times extracted the tooth.

And so I could take you through the entire list of these thirty-five cases, but, without taking more time, will merely state that they averaged about four treatments to the case, only one of which was lost,—namely, the one last referred to.

It is but natural that a man should be more enthusiastic than others over his own idea, but I think these results should be sufficiently convincing without further argument to recommend this agent as one worthy of careful consideration; and with this hint I leave the whole matter with you.

Discussion.

Dr. F. MESSERSCHMITT said that not having had an opportunity of reading the paper over previous to the meeting, he had endeavored to gain what knowledge he could on the general use of the drug. He had not been able to find anything in the dental journals except Dr. Nicholson's previous paper, and had found very little in the medical journals. In the March, 1900, issue of the *Laryngoscope*, Professor E. B. Gleason, clinic professor of otology, Medico-Chirurgical College, Philadelphia, gives a very good report on the use of protargol, from which he quoted as follows:

"As an injection in gonorrhea it has been most successfully used in from one-half to two per cent. solutions. In conjunctivitis excellent results are obtained when applied to the palpebral conjunctiva. A five, ten, or even a twenty per cent. solution may be used in the eye without producing more than transient irritation." The doctor reported four cases of prolonged otorrhea which were speedily cured by injecting a five per cent. solution, and he also used a five per cent. solution in the auditory canal and pharynx with success in decreasing inflammation and modifying secretion. For controlling hemorrhage or searing the stump of an aural polypus, protargol is greatly inferior to nitrate of silver.

In treating putrescent pulps he did not see that it had any advantage over sulfuric acid. His method is to apply the rubber dam, treat with sulfuric acid, and then fill the tooth. Dr. Messerschmitt asked Dr. Nicholson whether protargol would discolor teeth.

Dr. M. L. FAY, Buffalo, said that after Dr. Nicholson's previous paper on protargol he had used it in one case in which other remedies had failed. He applied a ten per cent. solution of protargol without any good result. This was his only experience with the drug.

Dr. NICHOLSON, closing the discussion, said he had little more to say except to answer Dr. Messerschmitt's question. He had not noticed in using protargol in solutions as strong as ten per cent. that the teeth were discolored, and he had left extracted teeth in the solution several days without any discoloration. As far as his experience went he thought that he had accomplished better and quicker results with protargol than with any other thing he had ever used.

The three cases mentioned in the paper were in the mouth of a lady who was one of the class who, so to speak, run to abscesses,—an abscess would form under circumstances which in another would be perfectly safe from such an occurrence. People differ, as we all know, in such regards. There was no other one of the

thirty-five cases which required so many treatments as did this mouth.

His experience with alveolar abscess with remedies used formerly had sometimes been very unsatisfactory, and his experience with protargol has been so satisfactory as to lead him to consider it the best of all remedies that he had ever tried.

The subject was passed, and Dr. G. V. BLACK read a paper on "The Value of Exact Methods in Operative Dentistry."*

At the close of the reading of Dr. Black's paper he exhibited devices for measuring the force which the jaw is capable of exerting, and the force expended in the use of automatic mallet and hand-pressure filling instruments.

There was no discussion, and Dr. A. H. PECK, Chicago, read a paper on "The Pathology, Chemistry, and Therapeutics of Putrescent Pulp."†

Discussion.

Dr. C. S. BUTLER, Buffalo, was sure he had never felt his own limitations more than at this moment when he was called upon to discuss this magnificent paper, and he complimented Dr. Peck on his readiness to acknowledge a mistake made in a former paper. This is the mind and attitude of all truly scientific men ever.

The paper treats of a subject which is practically fresh and new to us. Dr. Litch presented a paper on the same subject, which Dr. Truman, in the "American System of Dentistry," proclaimed to be the last word on the subject. In that paper Dr. Litch said the only gas developed by putrescence was hydrogen sulfid, while Dr. Peck has found there are several other gases developed. In the teachings of Dr. Miller we are told that germicides are all that are necessary in treating putrescent pulps, but according to his experience this is not true, and he had had a growing conviction that some deodorant was necessary to destroy the putrid gases that are thrown off.

The next step, then, is to produce a remedy that will combine the powers of a germicide and a deodorant, and he hoped Dr. Peck would have the honor of furnishing the profession with such a remedy.

Dr. G. V. BLACK said the subject was one to which he in the past had given some attention, and he would like to reinforce some facts brought out in the paper, especially as to the choice of antiseptics in certain cases. There are antiseptics and antiseptics: some are highly irritating, producing much pain; some are anesthetic, mitigating pain. We may use an antiseptic that will irritate the parts and cause a flow of serum which will interfere with the healing of the wound, or we can select one that will lessen the irritation, have an anesthetic effect, and inhibit the flow of serum. Carbolic acid is a pretty good anesthetic

*This paper was printed in full in the DENTAL COSMOS for December, 1900, page 1245.

†Printed in full in issue for December, 1900, page 1263.

and is an escharotic. Oil of cloves and oil of cassia are powerful antiseptics, but powerful irritants as well. As dentists, I ask you to study these properties carefully, so as to be able to use the remedies intelligently.

Dr. W. C. BARRETT said the subject of this paper was one that appealed to every dentist, and to himself especially. He was glad to have heard the paper. Dr. Peck, like other progressive men, has announced that he is not a post, that he will move, and the movement is ever forward. He did not adopt all of Dr. Peck's conclusions, but about the main facts as formulated there could be no question. What is putrefaction? It is the decomposition of albuminous and nitrogenous matter accompanied by offensive products. It is always infective. The pulp-tissue is nitrogenous, and therefore is subject to putrefactive changes. In such decompositions there is the evolution of compounds containing sulfur and ammonia, and these are always offensive to smell. The decomposition of albuminous matter and the infection by saprophytic organisms are the results with which we have to deal. When we treat putrescent pulps we have primarily nothing to do with the micro-organisms. They have done their work, have decomposed the pulp. A deodorant is of no use except to mask the odor. An antiseptic might prevent the further progress of the process of a putrefaction which may be complete as it is. A disinfectant is what is wanted. This destroys and removes the putrescent matter the products of decomposition, and it is that which first of all should be accomplished. He was glad to hear Dr. Peck refer to electrozone. This is the best disinfectant for putrescent pulps with which he is acquainted. It is absolutely non-toxic and non-irritant; with it we have no need for hydrogen peroxid. This latter forms a gas that will often force putrid matter through the apex of the root. Electrozone does all we need in antisepsis and with it at hand we seldom need any other antiseptic. But it must be comprehended that it has no therapeutic value. It is nothing but an agent for removing the by-products of putrefaction and it has no curative value whatever.

The discoloration of teeth with putrescent pulps is due to the penetration of the dental tubuli by the decomposed elements of the blood. The colors will vary from pink to dark brown. The bleaching of a tooth is best done in a moist state by a chlorin compound, and the effect is produced not by the action of the chlorin but of the oxygen set free from the moisture. But unless there is moisture present in the tooth, there will be no bleaching.

There were other points he would like to have discussed, but he yielded the floor to others who might wish to take part in the discussion. The subject of putrefaction appeals to dentists more powerfully than almost any other you can present to them. The infection by the septic organisms produces decomposition of the nitrogenous matter and develops offensive gases. This decomposed matter should be and must be removed by some

effective agent, and oxygen is the best agent we have. After disinfection, if an antiseptic agent is needed, it should be applied, and after the irritation which the use of these agents may have produced is quieted down you will have a physiological state and are ready for the operative procedure.

Dr. PECK said, in regard to the question raised by Dr. Butler, that the use of germicides in the treatment of cases of putrescence is not sufficient. This is true. There are so many elements produced by the decomposition of the contents of the pulp-chamber and canal that I early found that the use of germicides alone was insufficient.

When Dr. Barrett began to speak I expected to hear something raised that I would have to disagree with and answer, but I was disappointed. The theory that saprophytic micro-organisms were necessary for putrefaction was certainly stated in my paper. The chemical theory of putrefaction is untenable. The question of the discoloration of the teeth is a side issue simply mentioned in the paper and worthy of a good long paper alone.

The discussion was closed, and adjournment was taken till 8 P.M.

(To be continued.)

AMERICAN ACADEMY OF DENTAL SCIENCE.

THE annual meeting of the American Academy of Dental Science was held at Young's Hotel, Boston, November 14, 1900, when the following officers were elected: V. C. Pond, president; Frederick Bradley, vice-president; Frank Perrin, recording secretary; Geo. H. Payne, corresponding secretary; Wm. Y. Allen, treasurer; H. G. Hichborn, librarian; Chas. H. Taft, editor.

INSTITUTE OF DENTAL PEDAGOGICS.

AT the close of the eighth annual meeting of the Institute of Dental Pedagogics, held in Nashville, Tenn., December 27-29, 1900, the following officers were elected for the ensuing year: George E. Hunt, Indianapolis, Ind., president; Hart J. Goslee, Chicago, Ill., vice-president; H. B. Tileston, Louisville, Ky., secretary and treasurer. Member of Executive Board (three years) to succeed Henry W. Morgan, term expired, W. H. Whitslar, Cleveland, Ohio.

JEFFERSON COUNTY (N. Y.) DENTAL SOCIETY.

THE sixth annual meeting of this society was held in Watertown, N. Y., December 10, 1900, and was attended by a large number of dentists from central and northern New York. Drs. F. M. Willis, of Ithaca; I. C. Curtis, of Fulton, and Chas. H. Barnes, of Syracuse, held interesting and instructive clinics. These, together with papers

and clinics by local talent, made it decidedly the most profitable meeting in our history. Officers elected for ensuing year are: D. A. Scobie, Ogdensburg, president; Guy R. Danforth, Watertown, vice-president; R. F. Casler, Watertown, secretary and treasurer.

R. F. CASLER, *Sec'y.*

DENTAL SOCIETY ANNOUNCEMENT.

ALUMNI ASSOCIATION, NORTHWESTERN UNIVERSITY DENTAL SCHOOL.

THE "Annual Clinic" of the Alumni Association of Northwestern University Dental School will be held on February 22, 1901, at the college building, corner Madison and Franklin streets.

A. V. HARGETT, *President,*

G. B. MACFARLANE, *Secretary.*

EDITORIAL.

LOGICAL END OF THE DIPLOMA TRAFFIC.

WE learn with much satisfaction that the efforts which are being made to put an end to the illicit traffic in diplomas, as noted in our editorial in the July issue of the DENTAL COSMOS, have again borne fruit in the conviction of James and William Armstrong, of Chicago, who conducted the Metropolitan Medical College, and that the proprietors of this diploma-mill are now in jail for their crime. This result, taken in connection with the fate of the proprietors of a similar and equally notorious diploma-mill which figured under the name of the Cosmopolitan Medical College, the Illinois University, etc., should do much toward annihilating this infamous traffic.

We trust that the precedents in the cases cited may act as an efficient deterrent upon those who may hereafter attempt to embark upon enterprises of a similar character.

SOME JOURNALISTIC CHANGES.

WITH the July issue for 1900 the *American Journal of Dental Science* ceased publication. This journal, the publication of which began in 1839, enjoys the distinction of having been the first dental journal ever established. It was the official expression of a move-

ment made by the better class of dentists at that time to organize dentistry upon a professional basis, and antedated the establishment of the first dental college and the first dental association in the world by about one year.

It was published by a committee consisting of Eleazar Parmly, Elisha Baker, and Solyman Brown. They announced in the first number that the one object in the publication of the journal was the dissemination of useful and practical knowledge in dentistry, and the prospectus published in the same number reads in part as follows:

The plan of the *American Journal of Dental Science* may be expressed in general terms by saying that it is intended as a vehicle of useful information to the numerous operative dentists in the United States. That medical gentlemen will be its patrons to some extent there is little doubt, and that some general readers will become subscribers to the work, and peruse it with interest and profit, we think is equally certain.

The detail of our plan may be seen in the following particulars:

1. The journal will consist of forty-eight octavo pages per number, twenty-four of which will be employed in republishing standard works on dental theory and practice, as in the present number.
2. This specimen number is a sample of the entire work, as regards the size and quality of the paper, the character of the typography, and general appearance of the journal.
3. The republished works will be so printed that the numbers may be separated and the two halves distinctly bound, making two entire works, of which the republication will amount to at least a volume in each year worth of itself the whole subscription price of the magazine.
4. Each number will contain the biography of some dental writer or practitioner, with portraits in all cases in which they can be obtained.
5. Each number will contain a review of some dental work or translation from foreign languages.
6. Each number will contain communications from contributors on the various topics of useful discussion relating to the physiology, pathology, preservation, restoration, and general management of the teeth and adjacent parts.
7. Curious facts and dental anecdotes will give interest to the pages of the journal.
8. The arts of quackery will be boldly exposed, and the public will be instructed how to avoid the impositions of ignorant pretenders. [Etc.]

Dr. Chapin A. Harris's book, "The Dental Art," was considered in a review of nearly three pages, and an extract of about the same length from "A Treatise on Second Dentition," by C. F. Delabarre, translated from the French by Dr. Chapin A. Harris, followed. This number also contained "An Account of a Remarkable Tooth, with Drawings." This tooth was a central incisor in the mouth of a boy aged eight years, broken about where the crown joined the "fang," and reunited to the fang, forming a right angle at the point

of fracture. It remained in the mouth four years, when the writer of the description (Dr. E. Bacon, of New York) extracted it. Other articles in the first number are "An Extraordinary Instance of the Hereditary Principle," by Dr. Solyman Brown, of New York; "A Remarkable Case of Osseous Union of the Teeth," by Eleazar Parmly; and one by Josiah F. Flagg, entitled "Anatomical Discovery, the Ligamentum Dentis" (reprinted from the *Boston Medical and Surgical Journal*, February 27, 1839).

In accordance with the policy outlined in the prospectus, the first number is supplemented by an instalment of twenty-four pages of the "Natural History of the Human Teeth," by John Hunter.

We have reviewed the first number somewhat *in extenso*, in order to show the ambitious scope of the work and the value it had for a new profession. Succeeding numbers of the first volume are equally well filled with interesting and valuable matter, occasionally illustrated with woodcuts. There were also published from time to time fugitive verses and an occasional poem of some length, as, for example, one by Solyman Brown, with notes by Eleazar Parmly, entitled "Dentologia,"—a poem on the diseases of the teeth and their proper relations. The tendency to poetic effusion upon topics of this character was by no means uncommon at the period under consideration, several extensive and rather ambitious productions of that sort having appeared, especially in France.

With succeeding numbers the following important works were republished: "A Treatise on the Disorders and Deformities of the Teeth and Gums," by Thos. Berdmore; "A Treatise on the Anatomy and Physiology of the Teeth, etc.," by David W. Jobson; "A Treatise on First Dentition," by M. Baumes, translated by Thos. E. Bond, M.D., a member of the faculty of the Baltimore College of Dental Surgery; "The Principles of Dental Surgery," by Leonard Koecker; "Researches on the Development, Structure, and Diseases of the Teeth," by Alexander Nasmyth; "Treatise on Diseases of the Mouth, etc.," by J. B. Gariot, translated by J. B. Sevier, D.D.S.; "A New Treatise on the Theory and Practice of Dental Surgery," by J. Lefoulon, translated by Thos. E. Bond, M.D.; "Anatomy of the Dental System, Human and Comparative," by Ph. Fr. Blandin, translated by Robt. Arthur, D.D.S.; "Treatise on the Second Dentition," by C. F. Delabarre, translated by "A."; "Complete Elements of the Science and Art of the Dentist," by M. Desirabode, translated by "A."; "An Essay on the Structure and Formation of Teeth in Man and Various Animals," by Robt. Blake, M.D.; "The Youth's Dentist, or the Way to Have Sound and Beautiful Teeth," by J. R. Duval, translated

by J. Atkinson; "Dental Medicine," by Thos. E. Bond, M.D.; "A Treatise on Diseases of the Mouth and Parts Adjacent," by M. Jourdain.

With the tenth volume the republication of dental works ceased, but from the beginning, up to, and after this time the journal was filled with exceptionally valuable contributions from the able band of men who gave the first impetus to professional organization, and who laid the foundations of our professional progress so wisely and so well. No journal which our profession has ever had was more justly entitled to the hearty support of its members or ever gave better value to its subscribers. It successfully accomplished its mission in arousing an interest in dental education and professional association which has developed the present extensive and elaborate system of colleges of the present day, and fostered the production of a vast standard and periodical literature. The *Journal* served as a medium for the transmission of the best thought of the best exponents of dental art and science of the time, and it will always remain as a monument to their self-sacrificing professional spirit and their industry and professional culture. Of late years the *American Journal of Dental Science*, with the advent of other journals, has not kept up to its original high standard. It has gradually lost ground, and has finally passed, we suppose permanently, from among the living forces in dentistry. Its greatest value now will be as the worthy record of the pioneer phase of our profession, a record of which we may be justly proud, and one which will have an increasing interest to the lovers of dental history as time carries the period of our professional birth into the more remote past.

Announcement is made of the suspension of the publication of the *Indiana Dental Journal*, after three years of continuous publication, the editor having found that the unceasing attention demanded by his work upon the journal became a burden which, in connection with his other arduous duties, it was impossible for him to continue.

We take leave of the *Indiana Dental Journal* with much regret. It possessed a strong individuality and was always interesting, and during its short career we have every reason to believe exercised an important influence for good within the sphere of its activity.

We learn that Dr. N. S. Hoff, who some time ago assumed editorial control of the *Dental Register*, has purchased the title of the journal from the widow of the late Dr. Menges, and that the *Register* will continue to be published by S. A. Crocker & Co. We bespeak for the journal a successful future under the able management of its new editor and proprietor.

Dr. A. E. Webster, M.D., D.D.S., L.D.S., professor of orthodontia in the Royal College of Surgeons of Toronto, has been appointed editor of the *Dominion Dental Journal*, as successor to Dr. W. George Beers, deceased.

OBITUARY.

DR. W. GEORGE BEERS.

DIED, December 26, 1900, at his home, 107 Metcalf street, Montreal, Canada, Dr. W. GEORGE BEERS, the immediate cause of his death being heart failure.

Dr. Beers was a native of Montreal, having been born in that city May 5, 1841, his whole life having been spent in his native city. He was educated at the Lower Canada College and at Phillips School, Montreal.

After entering upon the practice of dentistry in Montreal, he in 1868 founded and published the *Canada Journal of Dental Science*. In the same year he was instrumental in the organization of the movement by which a bill was enacted into a law by the Legislature of Quebec, regulating the practice of dentistry in that province, and establishing a Board of Dental Examiners. Dr. Beers served for eleven years as secretary of the board. In 1892 the Board of Examiners organized the Dental College of the Province of Quebec, with Dr. Beers as its dean, an institution which we believe is still in existence, and is now affiliated to Bishops University, Lenoxville.

In 1889 the publication of the *Canada Journal of Dental Science* was discontinued, and was followed by the *Dominion Dental Journal*, with Dr. Beers as its editor, in which relationship he continued until his decease.

Dr. Beers was an able lecturer and public speaker, and an aggressive and versatile writer, with a keen and active interest in all that concerned the development of his profession. His literary ability was marked and was not confined by any means to professional themes. He contributed many articles to popular magazines, and was perhaps best known outside of the professional ranks by reason of his devotion to athletic sports, of which he was an active promoter, and in which he largely participated personally. He is credited with being the father of the Canadian national game of lacrosse, he having written the first book on that subject and made the first attempt to reduce the game to a set of rules. He organized and captained the first Canadian lacrosse team that visited England, in which country, as well as in Ireland and Scotland, the team played in most of the available towns, finally by command of the Queen playing a game at Windsor Castle, after which the members were severally presented to her Majesty and each received from her an autograph photograph. He organized a second lacrosse team which made a successful playing tour through England in 1883.

Dr. Beers was one of the founders of the Canadian National League in 1893, and when a youth he assisted in the formation of the Victoria Rifles, with which organization he served for many years, did duty during the two Fenian raids, and retired with the rank of captain.

While Dr. Beers's reputation as a contributor to the literature of his profession is an enviable one, he will be best known and remembered for his many contributions to athletic sports and outdoor pastime. He was genial in

manner, bright, witty, and sparkling in conversation, an enthusiast in all that he undertook, and a loyal friend. One who knew him well has said of him "Dr. Beers was a man who will be deeply missed in Canada. His influence has always been for good. His professional tone was elevated and he was impatient of anything debasing in its professional nature. He sometimes struck heavy blows, but they were always aimed at evil things. He never had a reproach for the man who was conscientiously trying to do right. He had no patience with quackery and dishonest practice. The little petty meanesses which seem to be the mainspring of action for many men, he could not comprehend."

In 1867 he married Mary Elizabeth Hope, who, with two sons, Arthur Hope Beers and James Crawford Beers, survives him.

DR. GEORGE F. WILLIAMS.

DIED, November 10, 1900, at Milford, Conn., from tuberculosis, GEORGE FRANK WILLIAMS, D.D.S., aged thirty-six years.

Dr. Williams was born in Bristol, England, in 1864, and came to this country when he was seventeen years of age. He began the study of dentistry in the office of Dr. Clinton W. Strang, Bridgeport, Conn., in 1884. He graduated from the University of Pennsylvania in 1890. Soon after his graduation he located in Milford, where by his skill, ability, and conscientious work he acquired a substantial practice. By his courtesy and natural affability he won a large circle of friends and acquaintances.

Dr. Williams was a member of the Connecticut State Dental Association. Of him it may well be said that he made good use of his opportunities,—as much so as any with whom it has been our pleasure and good fortune to be associated as preceptor and student. His life was marked by integrity and studious habits.

He is survived by a wife and one daughter.

CLINTON W. STRANG.

DR. BERNARD HESS.

DIED, December 23, 1900, at his home in New York city, BERNARD HESS, D.D.S., in his sixty-sixth year, of heart failure.

Dr. Hess was born on April 7, 1834, in Bergen, near Frankfort-on-Main, Germany. Upon his arrival in this country, about 1855, he took up his residence at Cuthbert, Ga., in which state he practiced as an itinerant dentist, traveling from plantation to plantation, remaining from three days to a week to complete such dental work as was requisite. At the outbreak of the Civil War he joined the Fifth Georgia Volunteers of the Confederate army, as a private. He was subsequently promoted as chief bugler of General Bragg's brigade, and saw service until the battle of Lookout Mountain, where he was captured and taken as a prisoner of war to Rock Island Barracks, Illinois. He was there selected to act as one of the hospital stewards, and after an imprisonment of fourteen months was released on taking the oath of allegiance.

He thereupon came to the city of New York, entered the New York College of Dentistry, then recently established, and graduated March 7, 1873. He continued in the profession until September, 1895, when he retired from active practice.

In 1878, in recognition of previous services, he was elected honorary mem-

ber and master of the Free German University of Arts and Science at Frankfurt-on-Main, Germany, and was awarded their diploma and medallion. He had traveled extensively in both Europe and America. Nine years ago he celebrated his silver wedding. He had for many years been a sufferer from organic trouble.

Dr. Hess leaves a widow, a daughter, and two sons, Samuel and Louis, both graduates of the New York College of Dentistry. Samuel is now carrying on the practice left by his father, and Louis is actively engaged in the practice of law in the city of New York.

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler. A star (*) indicates a thesis.

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- Braunig** (K.) *Retention der Zähne. Würzburg, 1899, A. Boegler, 28 pp. 8°.
- Mayer** (K.) *Zwei tödtlich verlaufende Fälle von Phlegmone des Halses ausgehend von einem Kariösen Zahn. München, 1900, Kastner-Lossen 28 pp., 1 l. 8°.
- Niemczyk** (R. E.) *Ueber teratoide Geschwülste der Mund- und Rachenhöhle. Breslau, 1899, A. Schreiber, 36 pp. 8°.
- Ozeki** (S.) *Die Tuberculose der Tonsilla palatina. Würzburg, 1899, Memmingen, 94 pp., 2 pl. 8°.
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LIST OF UNITED STATES PATENTS PERTAINING OR APPLICABLE TO DENTISTRY ISSUED DURING DECEMBER, 1900.

- Dec.* 4.—No. 662,967, to H. G. ROSE. Fountain spittoon.
 " "—No. 663,068, to XAVER DODEL. Dental elevator.
 " "—No. 663,086, to HUGH B. MITCHELL. Dental hand-piece.
 " "—No. 663,132, to FRANK RITTER. Arm rest.
 " "—No. 663,143, to B. M. WILKERSON. Dental chair.
 " "—No. 663,178, to NATHANIEL KUNS. Rubber dam.
 " "—No. 663,308, to GEO. H. TUTTLE. Method of vulcanizing rubber.
 " "—No. 663,309, to GEO. H. TUTTLE. Vulcanizer.
 " 11.—No. 663,507, to CHAS. W. MEGUIAR. Dental rubber-dam holder.
 " "—No. 663,721, to ROBERT BREWSTER. Artificial tooth.
 " 18.—No. 664,014, to WM. C. CORYELL. Dental floss holder.
 " "—No. 664,126, to JAMES W. COWAN. Dental floss holder.
 " 25.—No. 664,412, to MILAND A. KNAPP. Teeth regulating appliance.
 " "—No. 664,523, to GEO. C. AINSWORTH. Die punch.

THE

DENTAL COSMOS.

VOL. XLIII.

PHILADELPHIA, MARCH, 1901.

No. 3.

ORIGINAL COMMUNICATIONS.

EVOLUTION OF DECAY. No. II.

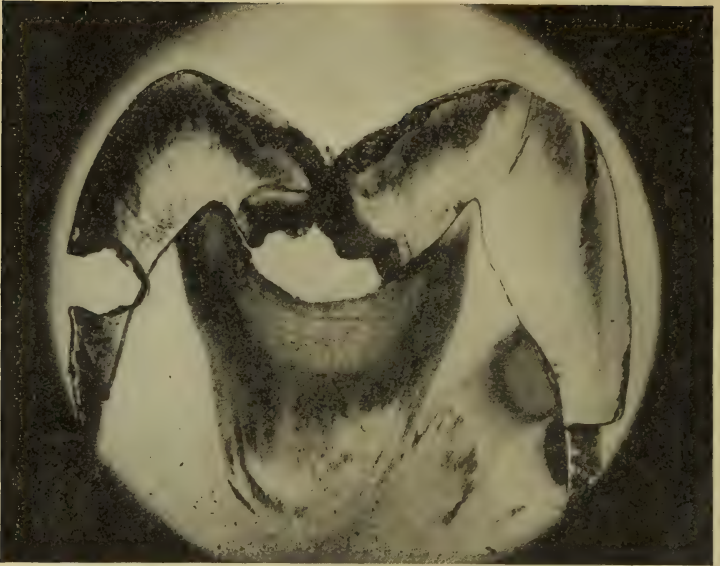
BY ARCH. C. HART, PH.B., D.D.S., M.D., SAN FRANCISCO, CAL.

(Presented to the Section on Stomatology, American Medical Association, June 5-8, 1900; also to the Annual Meeting of the California State Dental Association, June 19-24, 1900.)

IN July, 1897, the author presented a paper entitled "Bacteria of the Mouth" before the Pacific Coast Dental Congress. The following year "Evolution of Decay" was read before the California State Dental Association, and by special invitation before the Odontographic Society of Chicago and the Academy of Stomatology of Philadelphia. Mention is made of these papers because they all contain the description of a method that the writer has found to be of practical value in arresting and preventing decay of the teeth.

From the excellent results obtained by many of the profession in simply treating decay and pyorrhea alveolaris as diseases of local origin, I began a microscopical and bacteriological examination of the diseased gum tissues, the contents of the pus-pockets formed along the sides of the roots of teeth having pyorrhea alveolaris, and of the teeth themselves that had been lost owing to the ravages of the disease. In order that I might have the work the better under my control I had placed in my office an incubator. Cultures were made from the surfaces of the teeth and from the pus-pockets to learn something concerning the bacteria present, and if they had anything to do in causing pyorrhea alveolaris. These mixed cultures have been exceedingly interesting, for if the mouth from which the cultures were taken had that peculiar nauseating odor so characteristic of this disease, the same odor, so far as it was possible for me to detect, came from the test-tube—glycerin-agar being the culture-medium—in which the culture was

FIG. 1.



Showing effects in enamel and dentin of the penetration of bacteria and their solvents.

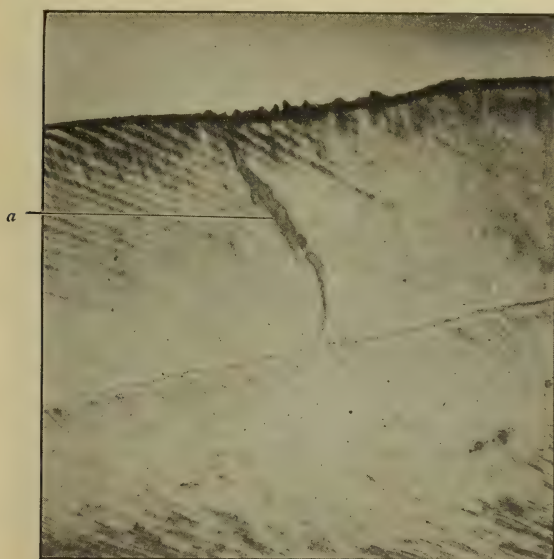
FIG. 2.



Same as Fig. 1, only more highly magnified. Shows masses of bacteria adhering to the surface of the enamel, also penetration of the enamel by bacteria. (Stained in Roux's double stain. Mounted in Canada balsam.)

growing. While this was interesting to the patient, it was especially so to some of the members of his own family. If there was any doubt in his own mind as to the part bacteria played in causing the foul odor or the formation of the "fur-like" coating forming on his teeth or tongue, an examination of the cultures growing on the media in the test-tube, which he had seen taken from his own mouth and placed in the incubator, completely dispelled all this, and the subsequent care taken of his teeth, gums, and tongue in the endeavor to keep them free from this "fur-like" coating I am sure has greatly aided me in my efforts in the prevention of decay of the teeth, as well as arresting the progress of pyorrhea alveolaris.

FIG. 3.



Showing point of selection (*a*) for entrance of the enamel by bacteria.

PENETRATION OF TEETH AND SURROUNDING TISSUES BY BACTERIA.

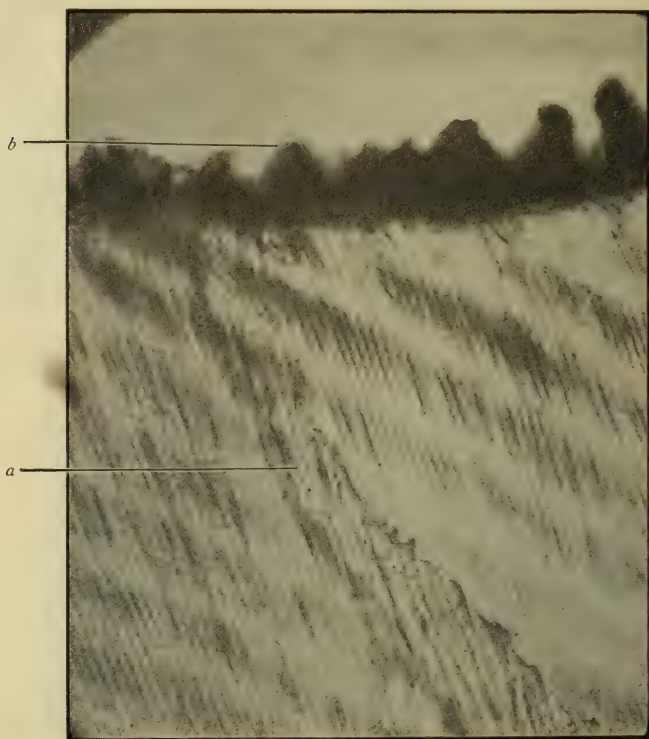
From observations which had been made by others as well as myself, I became convinced that the entrance of bacteria and their products into the teeth and their surrounding tissues is far deeper and of greater importance in the diseases of these tissues than is generally accepted. The direct rays of the sun, if used to illuminate a section of a tooth that has been properly stained to show bacteria if there be any present, will make visible bacteria in the enamel, dentin, and cementum that as examined by the ordinary methods of illumination would be invisible under the microscope.

In this connection attention is directed to Figs. 1 and 2, as they explain better than words the penetration of a tooth by bacteria; why biting anything hard may cause the tooth to break; why perchance a cavity is discovered it may be in just a few days after a patient has consulted the dentist and had the tooth pronounced free

from cavities that needed filling, and why fillings and surface cleansing fail in arresting decay.

In Figs. 3 and 4 there is shown a point of selection for entrance of the enamel by bacteria. Under direct sunlight bacteria can be distinctly traced at this point in the specimen almost through the enamel to the dentin. Why the bacteria should select this point I do not pretend to fully explain, any more than I can explain why some teeth, although almost constantly covered with masses of bacteria,

FIG. 4.



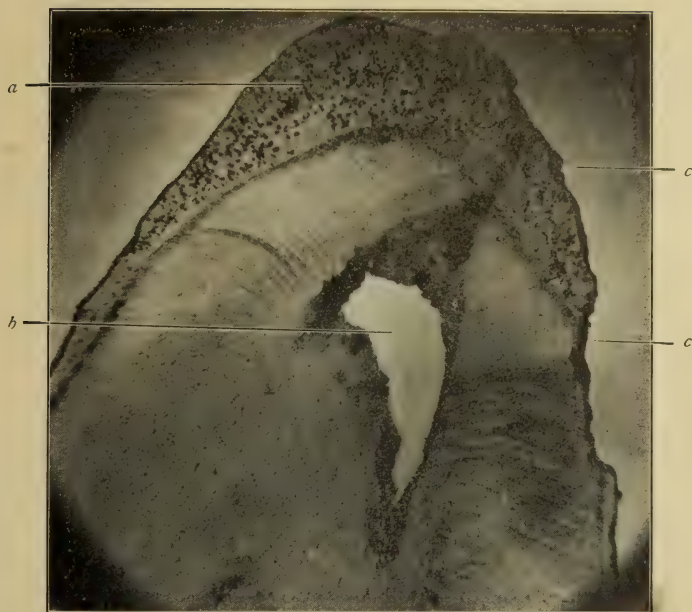
Same as Fig. 3, only more highly magnified.

- a.* Point of selection for entrance of the enamel by bacteria. Under direct sunlight, bacteria could be traced from the surface of the enamel down to the dentin.
- b.* Masses of bacteria adhering to the surface of the enamel.

do not decay. That the enamel has been penetrated at this point by bacteria I am positive, as far as I am able to determine with the means I have at my command. What often has appeared to me as perfect enamel I have found, after staining so as to show bacteria if any be present, to be penetrated at certain points, as shown in the illustration, although they were not visible until the section had been stained.

Those of you who will take the trouble to cut a section out of a decaying tooth and stain with Roux's double stain for twelve hours, then wash, dehydrate, clear, and mount in gum Thus and xylol,

FIG. 5.

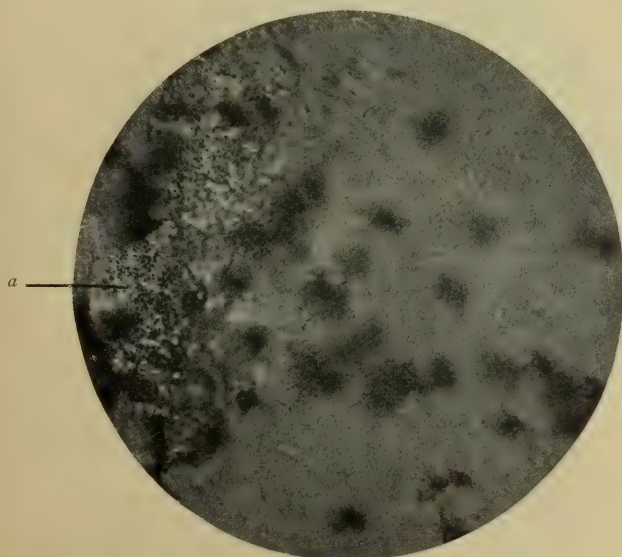


a. Cementum at the apex of a root which was abscessed. The cementum in this case was found to be penetrated by bacteria. (See Fig. 6.)

b. Nerve-canal. The most common avenue of entrance for bacteria into the cementum at the apex of a root. Explains why an abscess forms at the apex of the root.

c. Absorption of the cementum owing to the presence of an infected condition at the apex of the root.

FIG. 6.



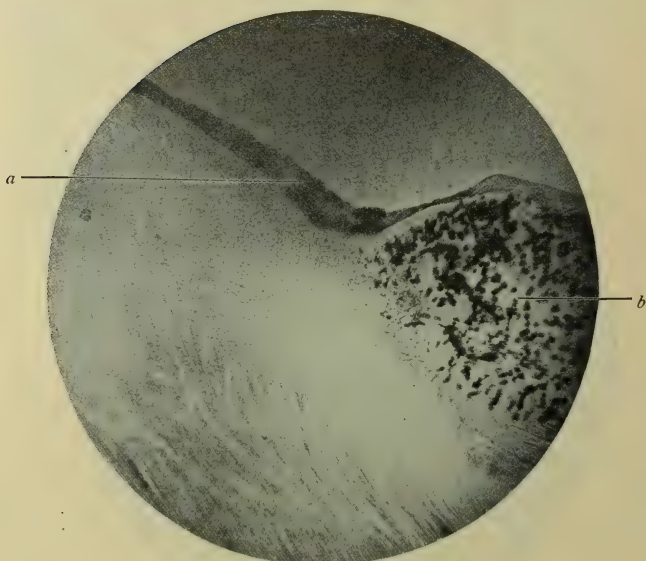
Same as Fig. 5, only more highly magnified. At *a* bacteria can be plainly seen.

FIG. 7.



Teeth lost by pyorrhea alveolaris.

FIG. 8.



Longitudinal section through an upper first molar.

b. The cementum between the roots. The cementum becoming penetrated by bacteria is in many cases the cause of pyorrhea alveolaris.

a. Showing the destruction of the peridental membrane. The dark line is caused chiefly by the staining of bacteria present in the cementum.

and examine under the microscope as aided by direct sunlight, will be astonished at the depth of penetration of bacteria and their solvents into enamel and dentin. I think you will be convinced that by purely mechanical measures it is impossible to remove the bacteria and their products from a tooth and have anything resembling a tooth left. It is impossible by sterilization to kill bacteria as far as they have entered the enamel and dentin, and thus arrest decay. For nearly four years it has been my custom to sterilize the surface enamel of teeth and cavities prepared for filling, and the results have far exceeded my expectations.

FIG. 9.



Shows that a portion of the cementum has become destroyed and that the peridental membrane is lost.

The prevention of decay of the teeth is far more important and easier of attainment than is generally believed. For the benefit of those of you who are not familiar with the methods recommended, a brief description will be given.

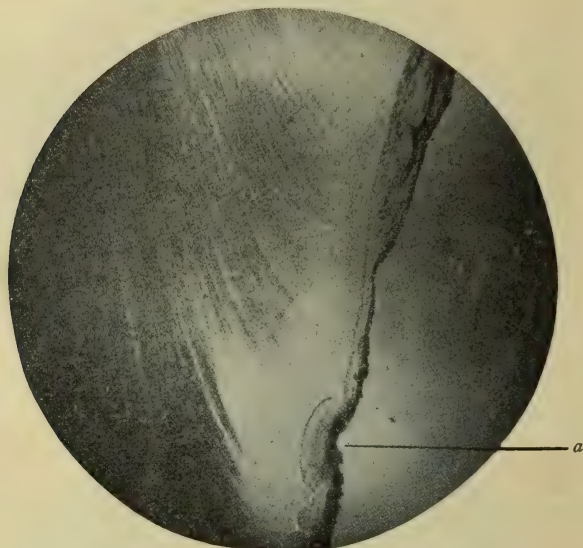
METHOD OF STERILIZATION OF TEETH TO ARREST AND PREVENT THE ACTION OF BACTERIA THAT CAUSE DECAY.

The surfaces of the teeth are thoroughly cleansed with pyrozone, then shaped and polished. This gives to the teeth a more beautiful appearance, increases their usefulness, facilitates their cleansing by the patient, as well as their sterilization, about to be described. The rubber dam is adjusted over all the teeth, from the second molar on one side to the central incisor of the same side; or more teeth may be under the dam if you choose. Leave abundant space between the holes in the rubber dam, so that there shall be no portion of the mucous surface of the mouth exposed. Doubly ligate the dam to the teeth with waxed silk thread.

The surfaces of the teeth are dried, and then bathed with water of ammonia, medium. This is allowed to act for about three minutes. Little pieces of cotton are packed in between the teeth so as to hold the solution in close proximity. While the surfaces of the teeth are still wet with the ammonia apply three per cent. pyrozone full strength, well soaking the tooth for five or ten minutes. Then dry, using a continuous hot-air blast, so as to dehydrate as rapidly as possible; this to occupy about ten minutes.

Next there is applied to the teeth a solution containing ten per cent. of formalin (of the forty per cent. aqueous solution) and fifty per cent. of alcohol. This is held in between the teeth with little pieces of cotton as before described, and their surfaces kept con-

FIG. 10.



Shows destruction of the peridental membrane and cementum by pyorrhea alveolaris, also the softening action of bacteria and their depth of entrance into the dentin. Adhering masses of bacteria can be seen with the microscope at *a*.

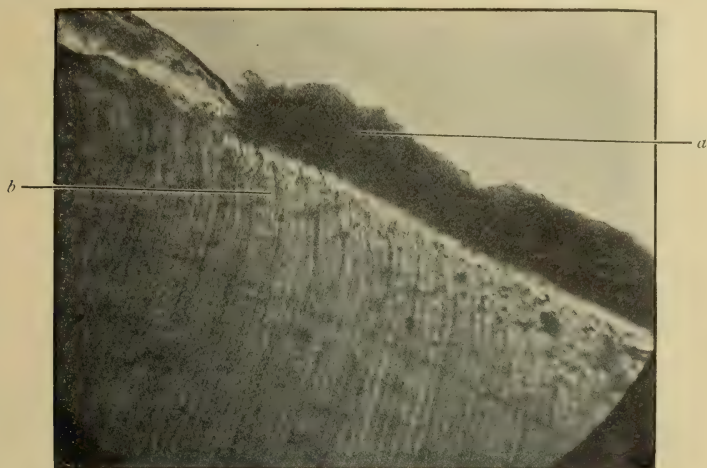
tinually bathed for thirty minutes. Before removing the rubber dam the surfaces of the teeth are dried, in order that there shall be no action of the formalin upon the mucous surfaces of the mouth, as it is very irritating, and when locally applied in strong solutions sometimes results in a bad slough.

The extraction of the third molars, if the rest of the teeth are in position, is practiced in many cases. Their sterilization is exceedingly difficult; most of my failures have come from attempts to prevent decay in these teeth. The liberal use of a saturated solution of nitrate of silver upon the surface enamel will often penetrate deeply enough to arrest and prevent decay. The soft tissues should be protected, and the tongue and cheeks kept from contact by the use of rolls of non-absorbent cotton.

At the end of three or four months have the patient return for

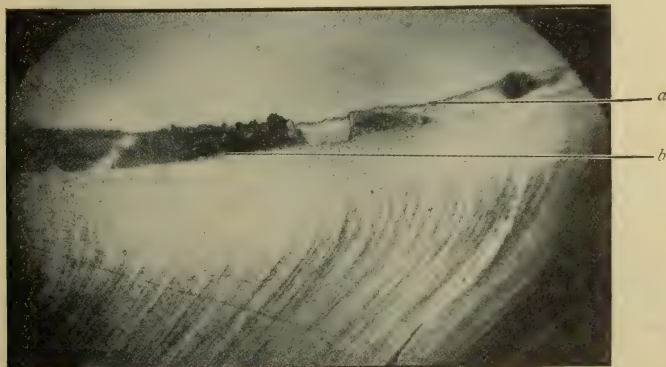
examination and thorough cleansing of the mouth. This time the work will be very much easier. Do not fail, however, to adjust the rubber dam and sterilize in the manner already described. By repetition of this sterilization every three or four months, together

FIG. 11.



Longitudinal section of a tooth, showing (a) periodental membrane overlapping the enamel. Note (b) the fibrils penetrating the periodental membrane. This tooth has never had pyorrhea alveolaris.

FIG. 12.



Longitudinal section of a tooth lost from pyorrhea alveolaris. Note (a) the loss of the periodental membrane. The dark portion of the cementum (b) is penetrated by bacteria, which can be easily seen under the microscope by the aid of direct sunlight.

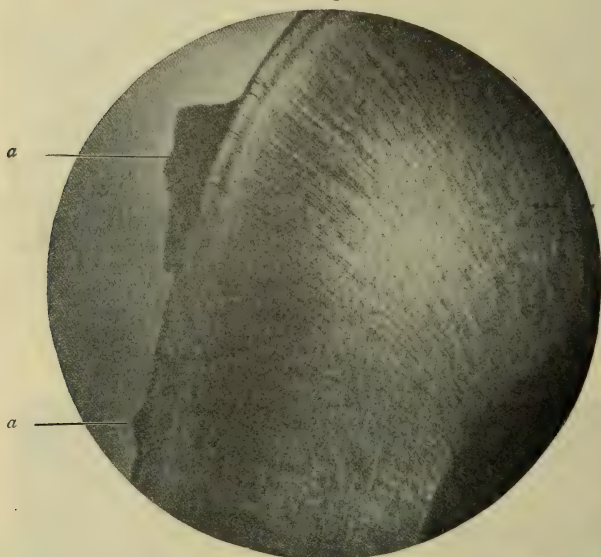
with the more careful prophylaxis on the part of the patient, I have been able to arrest and prevent decay in mouths where previous to my efforts at sterilization the teeth were rapidly being lost by decay. The time consumed in putting the teeth in a sterile condition is sure to impress the patient with the importance of antiseptic measures.

The sterilizing of enamel and dentin in the prevention of decay suggested the sterilizing of the cementum and surrounding tissues in the treatment of dental abscess and pyorrhea alveolaris. The results were so satisfactory that I was led to believe that both of these diseases were largely caused by bacteria. I have since made a great many sections of abscessed teeth and teeth lost by pyorrhea alveolaris. In nearly every section I have found in the cementum large quantities of bacteria. (See Figs. 14 and 15.)

METHOD OF PREPARATION OF TOOTH-SECTION TO SHOW BACTERIA.

The tooth while warm is placed in a ten per cent. solution of formalin and fifty per cent. alcohol and left for six hours or longer. It is then sectioned, using a thin diamond disk, getting a section

FIG. 13.



Horizontal section of a tooth lost from pyorrhea alveolaris. On the surface of the cementum is to be seen (a) a small piece of tartar still adhering to the root.

about one-sixteenth of an inch; thinner if possible. This is again placed in the formalin solution and left two hours. It is then removed and ground on a lathe until about as thin as two sheets of ordinary writing paper, then washed in distilled water and again placed in the formalin solution already mentioned and left two hours. A smooth hone is placed in a dish of distilled water, the water just covering the hone. With a small pill-bottle cork the small piece of tooth is held against the hone and polished until it is nearly as thin as a piece of ordinary writing paper. It is then washed, and again placed in the formalin solution and allowed to remain an hour or more. It is then removed, washed, and stained in Roux's double stain for at least twelve hours, dehydrated, cleared in oil of cloves, and mounted in gum Thus and xylol. The fixing in the formalin solution keeps the bacteria in position and makes

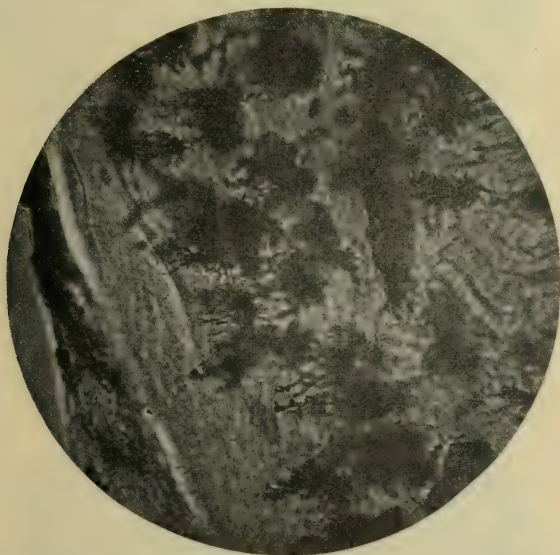
the specimen very tough, so that the cutting and polishing can be accomplished with much less danger of fracture.

Figs. 5 and 6 were made from a longitudinal section of a tooth that was abscessed. Fig. 5 shows the cementum at the apex of the root and the nerve-canal, the most common avenue of entrance for bacteria into the cementum. Fig. 6, a more highly magnified view of a portion of the preceding illustration, shows the little lakes and canals and the bacteria that penetrate the cementum and cause dental abscess.

METHOD OF STERILIZATION TO ARREST DENTAL ABSCESS.

In the treatment of acute dental abscesses the sterilization of the cementum is easily accomplished, in the majority of cases one sterilization being sufficient to abort the abscess.

FIG. 14.

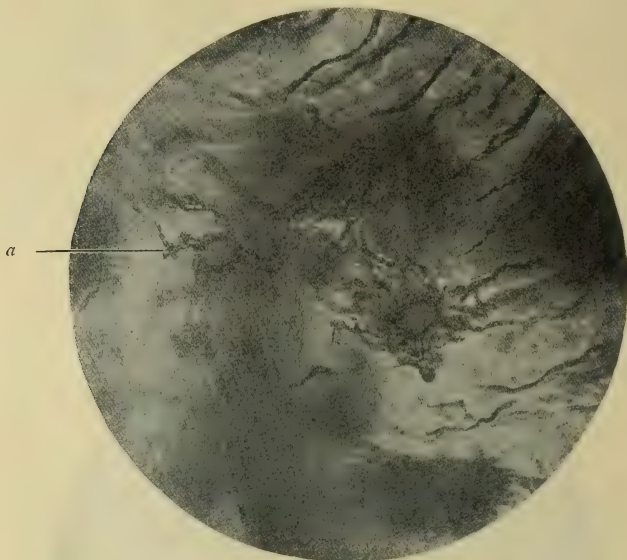


A highly magnified view of a portion of the cementum seen at *b* in Fig. 8. At this point the cementum will be found to be penetrated by bacteria. I take their presence in the cementum to explain why there are so many failures in treating pyorrhea alveolaris.

The root-canal is opened and cleansed after the method suggested by Dr. Callahan. The canal is then dried, using a continuous hot-air blast. It is then flooded with a solution containing ten per cent. of formalin and fifty per cent. of alcohol. This is vaporized slowly, using the Evans root-canal drier. Then there is carried into the root-canal myrtol on a wisp of cotton. The cotton is packed dry in a manner somewhat similar to that practiced by those who fill root-canals with cotton, and the myrtol is taken up with the pliers and brought in contact with the fibers of cotton. The external opening of the root-canal is filled with cement. This is allowed to remain until all soreness has disappeared from the tooth. Acetanilid comp. is given internally in five to ten grains; dose repeated every two hours, or oftener if

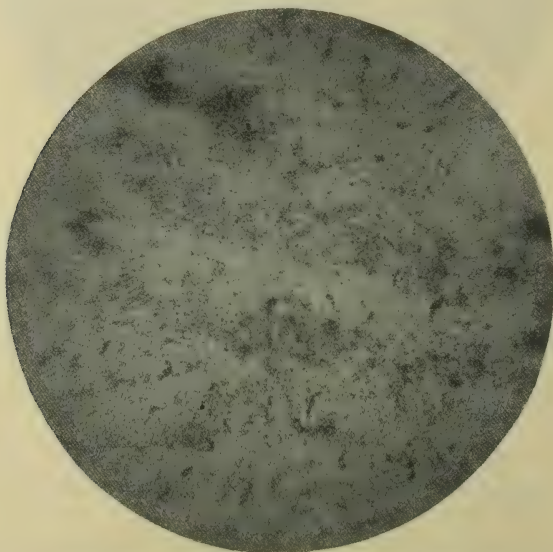
necessary, for the relief of pain. Silica 6 x trit. three grains in one-quarter glass of water, one teaspoonful every half-hour, is given to reduce the swelling.

FIG. 15.



A more highly magnified view of a portion of the preceding illustration (Fig. 14). *a* shows bacteria in the lacunæ and canaliculi. This tooth was lost from pyorrhea alveolaris.

FIG. 16.



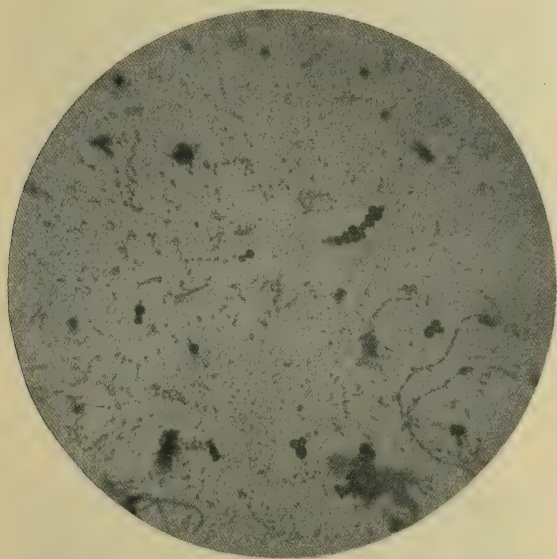
Cover-glass preparation of bacteria taken from a pyorrhea pocket found along the side of a root of a tooth.

In chronic cases there is sealed in the root-canal with cement either myrtol or oil of cinnamon, and left for three or four days.

If a fistula be present and fails to heal after curetting and sterilizing with a saturated solution of carbolic acid, the apex of the root of the tooth is cut off, attempting to remove only the cementum. In the majority of cases smoothing the apex with a finishing bur is all that is necessary. It is not the mass of dentin forming the root proper that becomes infected, but it is the cementum forming the apex. (See Figs. 5 and 6.)

In pyorrhea alveolaris the cementum on the side of the tooth where the pocket is situated will be found penetrated by bacteria. I found them in the sections that I have made, and I believe their presence here is largely responsible for the failures we experience in the treatment of this disease. (See Figs. 14 and 15.)

FIG. 17.



Cover-glass preparation of bacteria taken from a pyorrhea pocket found along the side of a root of a tooth.

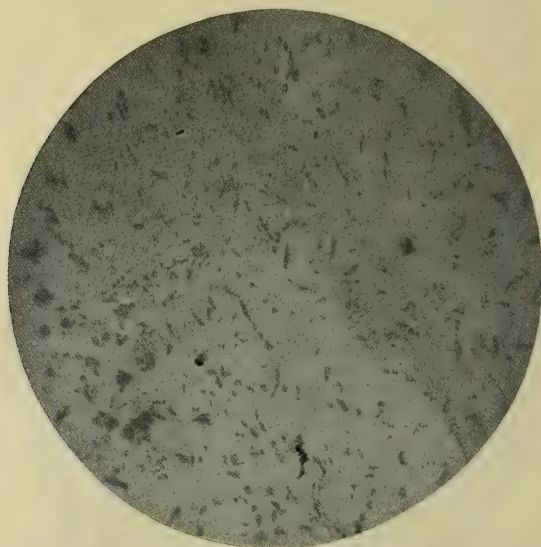
CAUSE OF THE FORMATION OF TARTAR.

I believe the bacteria present in these pockets are indirectly the chief cause of the formation of tartar. Steinman has demonstrated that albuminous substances are capable of precipitating lime from solutions in which it is present as a chlorid or sulfate, in the form of a carbonate, and he has shown that the shells of mollusks are produced by the calcification in this way of mucous materials elaborated by the mantle epithelium.

Chemical analyses of masses of bacteria have shown them to be mainly composed of albuminous substances. In these pyorrhea pockets are to be found great masses of bacteria; in truth, the pus that exudes from under the gum is chiefly composed of bacteria. The surfaces of the teeth, especially at the margins of the gums, are covered with a thick coating of bacteria. It is evident that

these conditions, chemically speaking, explain why the lime present in these pockets may be precipitated. Mignot has shown that so long as bacteria retain their virulence they cannot form calculi, but only a sediment mixed with pus. This conclusion was reached as the result of his experiments in the formation of typical calculi in the gall-bladder of guinea-pigs. This precipitate has no tendency to adhere to foreign bodies. He then shows why previous attempts to form calculi have failed; the bacteria must be attenuated, not virulent. When sufficiently attenuated, they are no longer pathogenic when injected into the cellular tissue of animals. Mignot

FIG. 18.



Cover-glass preparation of bacteria taken from a pyorrhea pocket.

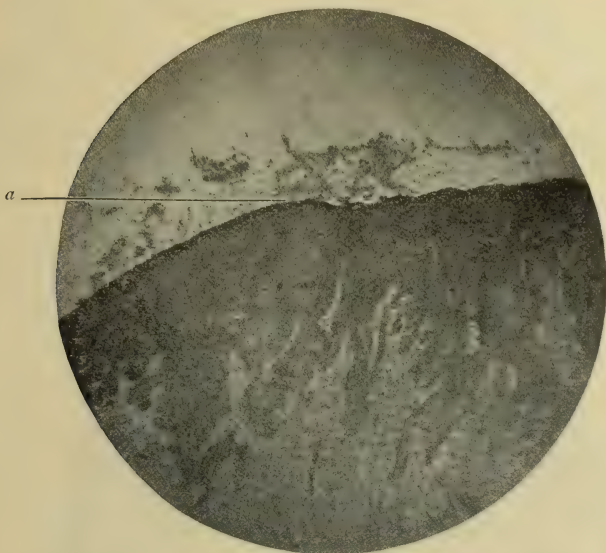
has proved that the typhoid bacillus, the *Bacillus coli*, staphylococci, streptococci, and even the non-pathogenic *Bacillus subtilis* are capable of giving rise to calculi, and probably a great number of other organisms are equally so.

TREATMENT AND METHOD OF STERILIZATION TO ARREST PYORRHEA ALVEOLARIS.

The Puncture Process.—Before removing the tartar the surfaces of the teeth and gums are sprayed with a solution containing equal parts of pyrozone three per cent. medicinal, and hydronaphthol one-quarter per cent. The soft tissues are anesthetized, then punctured, using a very small cataract knife and the spoon-shaped excavator, Darby and Perry set, Nos. 19 and 20, that have had the sides of the spoon removed, giving them a spear-pointed appearance. This depletes them with little loss of tissue, reduces the inflammation, making easier the work of scaling the tartar from the root and the sterilization of the cementum and surrounding tissues. This punc-

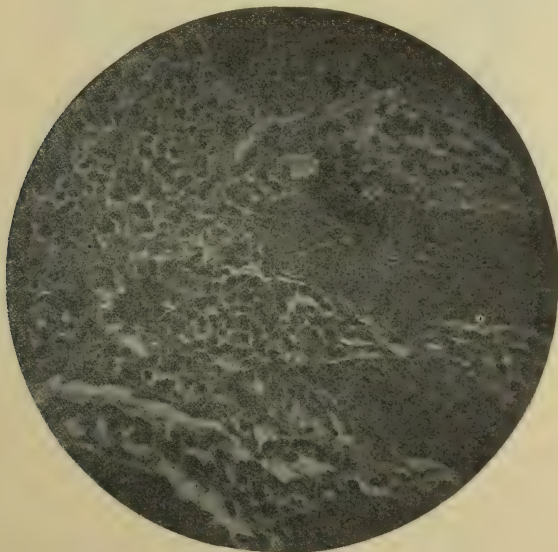
ture process is thoroughly done, and the object is to destroy the pocket and force the tissues to lie against the sides of the roots so

FIG. 19.



Same as Fig. 18 under a higher power. *a.* Shows masses of bacteria adhering to the surface layer of the epithelium, also the round-celled infiltration that has taken place. The latter condition is better shown in Fig. 20.

FIG. 20.

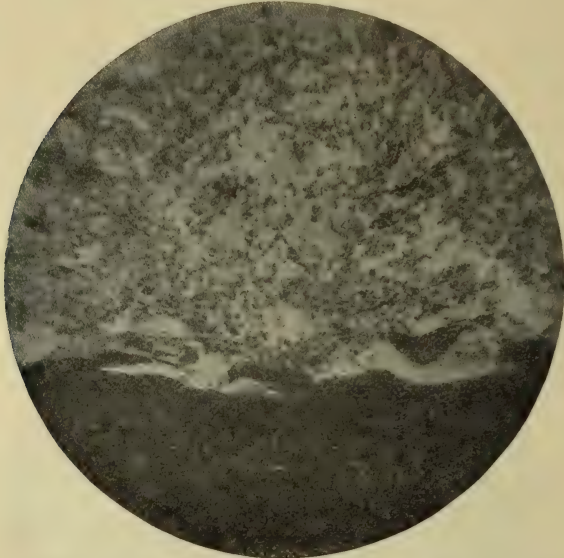


Same section as Fig. 19 under a higher power. Shows round-celled infiltration more clearly.

that union can take place. It makes the removal of the tartar very much easier, as the scaling instrument can be passed directly

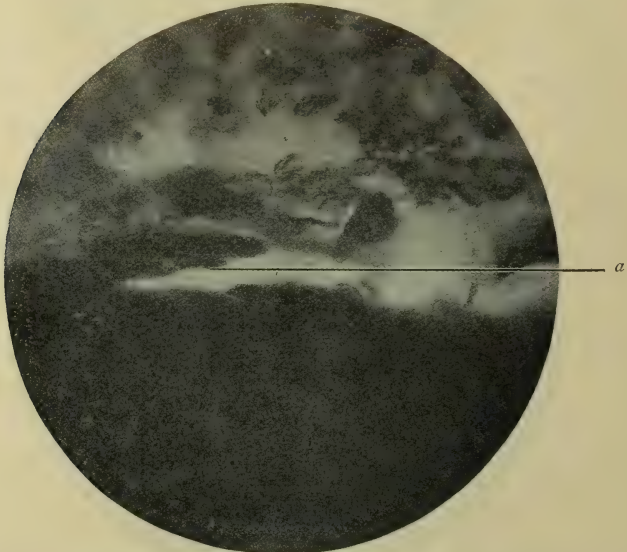
through the soft tissues and dislodge the tartar. The gums are sprayed with the pyrozone-hydronaphthol solution ten or twelve

FIG. 21.



A higher magnification of the portion of Fig. 19 marked *a*. Shows masses of bacteria, blood-corpuscles, and epithelial cells.

FIG. 22.



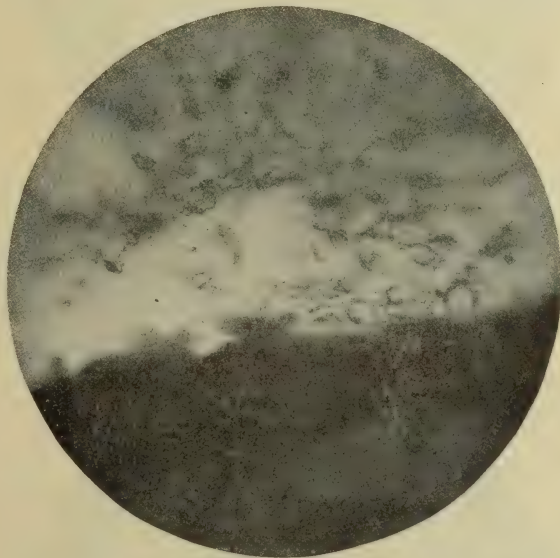
Section of gum tissue taken from about the neck of a tooth with pyorrhea alveolaris. The swollen and loosened condition of the cells of the surface layer of epithelium is shown at *a*.

times during a half-hour sitting, using compressed air under thirty-five pounds pressure. This forces the wash for a considerable dis-

tance into the soft tissues and the cementum. Every particle of the tartar must be removed if a cure is to be accomplished. In the puncture process the aim is not to cut the gum tissue into strips, but to punch it full of holes. It relieves the congested condition of the tissues, and washes away quantities of bacteria that may have penetrated the surface layer or even the deeper layers of cells of the epithelium. The gums are punctured before attempting the removal of the cementum; in fact, this puncture process is repeated whenever any scaling or scraping of the root is attempted.

Use of the Compound Tincture of Benzoin.—At the end of each treatment dry the soft tissues and paint with three or more coats

FIG. 23.

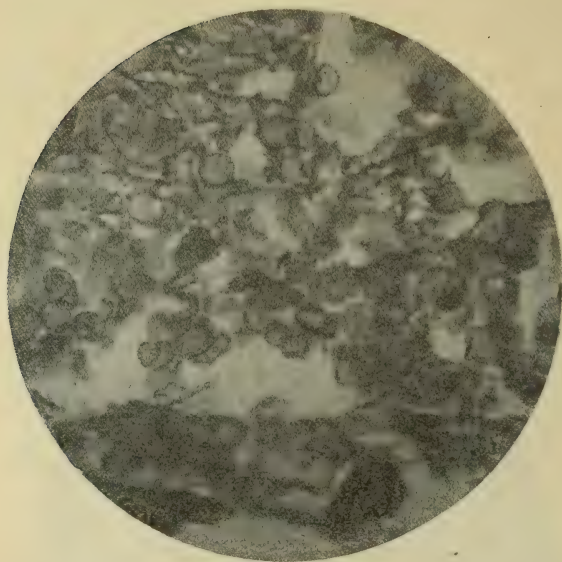


Rod-shaped bacilli growing in the cellular tissue of the surface epithelium; also blood-corpuscles.

of the compound tincture of benzoin. This protects the soft tissues from infection, a measure that in the successful treatment of pyorrhea alveolaris is very important. The tincture of benzoin compound will adhere to the soft tissues twelve or more hours. Caution the patient not to brush the teeth until the next day, but to depend upon frequent use of the mouth-wash in cleansing the teeth and soft tissues.

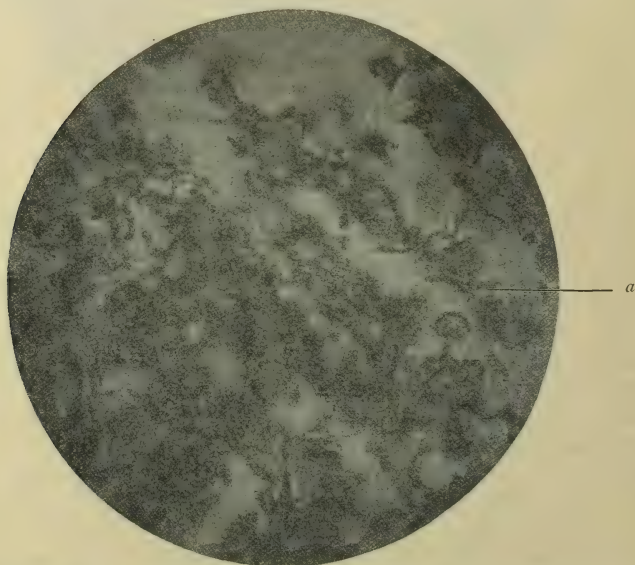
Removal of Tartar and Cementum.—When removing the tartar endeavor to leave the surface of the cementum smooth. Should there still be a discharge of pus in a week after the first treatment, and consequently no union of the gum tissues with the cementum, and you are sure all the tartar has been removed and that the soft tissues are not to blame, remove a portion of the cementum, and I have found the enamel cleavers of the S. S. White Dental Mfg. Co. to be excellent instruments for this purpose. I have ground them down so that they are somewhat smaller, and they do the work

FIG. 24.



A slightly different field of the same section from which Fig. 23 was taken. In the lower left corner can be seen a portion of the epithelial cell marked *a* in Fig. 22. Blood-corpuscles are plainly shown, also the curved rod-shaped bacilli believed to be an active factor in pyorrhea alveolaris.

FIG. 25.



Cover-glass preparation showing (*a*) the curved, rod-shaped bacilli which the author believes to be an active factor in causing pyorrhea alveolaris. (Taken from a pyorrhea pocket.)

very nicely. In some cases the cementum may have to be scraped several times before there is an attachment of the soft tissues. In the removal of the cementum endeavor to leave the exposed por-

tion of the root as smooth as possible, as it is not so easily infected, and I believe this facilitates the attachment of the soft tissues.

Removal of Pulp.—The reflexes caused by the extreme sensitiveness of the pulp in teeth with pyorrhea alveolaris, which have entirely disappeared with its removal, have led me to practice this operation on the molars and bicusps in most of the chronic cases of this disease treated, especially in those past middle life. This operation makes the removal of the tartar and the infected cementum less painful. In my practice I have yet to see anything but good result from this operation.

Immobility of the Teeth.—This is secured by the use of silk ligatures, crowns soldered in series, bridge-work, or whatever mechanical device the case may require to secure the required degree of immobility.

Mouth-Wash.—I have found equal parts of pyrozone three per cent. medicinal and one-quarter per cent. solution of hydronaphthol to be an excellent mouth-wash. The slight amount of acid that may be present appears to have no detrimental action; in fact, I am a believer in slightly acid washes in the treatment of pyorrhea alveolaris, and have seen excellent results in my practice in the prevention of formation of tartar from the daily use of a weak solution of alum. The slight amount of acid present prevents the formation of tartar because whenever the tartar is depositing there is present an alkaline action.

EXPLANATION OF FIGURES.

Teeth lost by pyorrhea alveolaris. Attention is called to Fig. 7, "Teeth lost by pyorrhea alveolaris," as it shows a photograph of some teeth lost by this disease and tells something of its various forms. Teeth are affected differently by it. On some the accumulation of tartar is wonderful, as is seen in the illustration. As a rule, where tartar is depositing rapidly the teeth do not decay.

Sections were made from these teeth, and your attention is asked to a few of the photomicrographs I have prepared, which show, to my mind at least, the average condition as I have found it in teeth having pyorrhea alveolaris.

In Fig. 8 we have a longitudinal section through an upper first molar, showing the cementum between the roots near their point of union,—a point that I formerly found exceedingly difficult of treatment until I learned the cause, which I shall endeavor to explain in some of the figures that are to follow. The dentin at *a* will be seen to have quite lost the peridental membrane. This is better shown in Fig. 9, which is from the same section. Note how the cementum has become absorbed. This latter condition is better shown at Fig. 10. Figs. 11 and 12 are shown for the sake of comparison. Fig. 11 is a tooth that has never had pyorrhea alveolaris. The peridental membrane is seen adhering to the cementum and overlying the enamel. In Fig. 12 the peridental membrane is almost if not entirely destroyed and the cementum has become infected by bacteria. Fig. 13 shows a horizontal section of a tooth lost by pyorrhea,—the bicuspid in the lower left-hand corner, Fig. 7. The cementum has lost all of the peridental membrane, and there can be seen a small piece of tartar still adhering to the cementum. Fig. 14 is a highly magnified view of a portion of the cementum seen in Fig. 8. In this section bacteria are to be seen under the higher powers in the lacunæ and canaliculi. See Fig. 15, which shows a rod bacillus quite plainly.

Cover-glass preparations of bacteria from the surface of the teeth and from pyorrhea pockets. See Figs. 16, 17.

Gum-tissues and how bacteria cause the gums to be infected. Fig. 19 is a section of gum-tissues from the side of a pyorrhea pocket, showing masses of

bacteria adhering to the surface layer of the epithelium. It shows the round-celled infiltration that has taken place. This may explain why the gum-tissues surrounding teeth with pyorrhea are so apt to bleed upon the slightest irritation. Fig. 20, same section as Fig. 19 still more highly magnified, shows the round-celled infiltration more clearly. Fig. 21 shows masses of bacteria, blood-corpuscles, and epithelial cells.

The surface layer of epithelial cells has been compared to the shingles on the roof of a house. If anything causes the shingles to loosen the end may rise up, letting in water if it should rain. So with the cells of the surface layer of epithelium. If they become swollen or loosened they may allow bacteria to enter the tissues and permit the blood-corpuscles to escape. This loosening of the surface epithelial cells is beautifully shown in Fig. 22. Especial attention is asked to Fig. 23. It shows bacteria in the cellular tissue of the surface epithelium. This to my mind explains how bacteria cause the gum to become infected. Under the microscope these bacteria can be seen growing in the surface epithelium very plainly. These bacteria are slightly curved, rod-shaped bacilli. The rods are slightly thickened at the ends, which give to them a club-shaped appearance somewhat like the Klebs-Loeffler bacilli. See Figs. 24 and 25.

This is given only as a preliminary report until further investigation can be made.

The author desires to acknowledge his indebtedness to Drs. F. G. Canney and C. E. Hart for their assistance in the preparation of specimens and in illustrating this article.

DOGMATISM AND CLINICAL EXPERIENCE, ILLUSTRATED BY COMBINATION FILLINGS.

BY A. G. BENNETT, D.D.S., MINNEAPOLIS, MINN.

IN order to show that the profession has always been more or less influenced by the *prominence* of dictators and dogmatists, I will first quote a few sample sayings that seem at first sight plausible, if not reasonable, and yet are most misleading when tested by actual experience. I will introduce these points by a statement of the late Professor Garretson that will serve as a standard of comparison respecting practical operations on the teeth. Alluding to the self-laudatory attitude of some men, he said in substance that we as dentists are too often puffed up by operations no more difficult and delicate than many men perform daily in the arts and industries and think nothing of them at all. Of course this saying is not meant to include the finest operations of our best men, for the art of filling teeth has always been a more or less intricate and difficult operation.

But the kind of sayings that I started out to quote are the partial or fragmentary sort that often ignore not only fundamental facts, but the varying conditions that exist in the teeth. To begin on the surface, the first statement relates to enamel cleavage. A prominent man, recently deceased, said in substance that if he had to pay attention to this point in every cavity he would never get anything accomplished,—meaning, of course, that the point was not worth while, or demanded more time than it was worth.

The next point in order of time that I recall relates to the prepa-

ration of root-canals. A late college professor, who made no small claims to being scientific, said that a drill should never be used in a root-canal, apparently not perceiving that those roots that are drilled out the most carefully, as in crowning, can be filled the most perfectly, and, of course, always give the least after-trouble. It is hardly necessary to add that the very small tortuous canals cannot always be drilled out safely, if at all; and those turning more or less at right angles are certain to be clogged or the root perforated by even the most flexible drills.

Another man, a prominent professor of materia medica and therapeutics, condemns drying out root-canals, claiming that this process is useless, if not injurious, and ignoring the fact that desiccation is one of the essential conditions for all fillings whatsoever. Evaporating germicides in this way is certainly one of our strongest points in filling roots; and the consequent adhesion of the filling-material is a point equally strong in attaching or inserting any material to or into tooth-structure.

The next point relates to preparation of cavities, the importance of which no man can dispute. But when some men of a certain school preach that all approximal cavities in bicuspid and molars should not only be made much larger than contour demands, but rectangular in shape, and that, too, without regard to the form, density, or sensitiveness of the teeth or the endurance of the patient, the position of these men becomes so untenable as to expose them to just criticism from all sides. Enlarging approximal cavities so as to contour and prevent contact of tooth-structure is an old, familiar idea, dating back at least into the "seventies," and "extension for prevention" is merely a new way of stating the old principle. Certainly some of these men go to an extreme that few will choose to follow.

Finally, a point as to porcelain inlays would seem to be very timely. A dentist who has become somewhat prominent through his advocacy of another man's ideas and methods rather than his own, pronounces the inlay to be a humbug, and that, too, in the face of the fact that many careful, skillful, and conscientious men have practiced this method with at least a fair degree of success, and are developing its capacities on several points that promise much for the future. Such men as these are neither consciously nor unconsciously advocating or indorsing a humbug.

I. *Basis for the Theme.*—As a basis for the subject of my paper I will state that science is not only the keynote of the age in a general sense, and the corner-stone of progress of all kinds, but it may be truly called the entire foundation of those arts and professions or specialties which rest on anatomy, chemistry, physiology, and materia medica. It must be added, however, that this foundation is imperfect and incomplete, being still in the process of building. Again, the most marked characteristic of the age is found in a tendency to revise all heretofore accepted knowledge in the light of recent scholarship. To bring our subject still nearer to a focus, there is a marked tendency to strike at the root of much error in all fields of research, and in particular in that of the physical sciences, by depending less on the library and more on the laboratory.

But it should be almost needless to state that the laboratory has its limitations, especially when we must reckon with vitality and mentality, not to mention the personal equation. For my part, I have heretofore been too strongly influenced by laboratory demonstrations, and have been somewhat inclined to undervalue what is familiarly known as clinical experience. In other words, I have regarded clinical experience chiefly as the means of furnishing the raw materials of science. But it seems to me that recently the laboratory has attempted to prove too much, and that, too, in the absence of some of the conditions that never can be left out of the equation. On the other hand, some of our writers are misled by appearances to the extent of being satisfied with *resemblances*, failing to note *differences*, which are more deeply significant, and therefore not discovering the *relation* of things, which is the ultimate end of science. But, to give our ideas a concrete and practical turn, I propose to present some facts found in the mouth and in the teeth that will serve to show that the laboratory as it now stands is not a finality.

I will take the subject of combining cement with gold and amalgam, as I have practiced it and as I believe it has been generally practiced for about ten years.

I will say in general that our few filling-materials have so many defects and limitations that conditions demand, and experience fully justifies, their combination, for in this way only can we secure all their better qualities and eliminate as far as possible their marked defects. All tissues and materials are more or less permeable, and cement more or less soluble; and the central principle or the supreme object in all our work, especially in fillings, is to obtain as perfect a joint as possible, since absolute perfection is out of the question. I will add here that I have always cultivated the habit of carefully inspecting the crown- and root-fillings found in teeth that I have extracted. Recently this source of study has been very limited, though of course as reliable as ever.

II. *Method of Combining Fillings.*—My first ideas on the subject of using cement under fillings were published in 1884. I then used it under all large and deep fillings, but allowed it to set before completing the operation. I used this method for about five years with much satisfaction as to comfort and durability. It is described in the "American System of Dentistry," Vol. II, page 249. This method I now regard as crude and primitive. As soon as Dr. Clapp, of Boston, published his method of using copper amalgam under gold it at once occurred to me that cement used in that way would be a decided improvement, and from that time to this it has been my practice to use cement under gold and amalgam in all cavities except the very smallest and corners on front teeth. I do not claim anything original or exclusive in this method, but I refer to it at this time to show its strong points, among which are the following:

1. The cement when properly used makes the most perfect joint of all our filling-materials.

2. The cement is decidedly adhesive, and answers the double purpose of sticking tightly to the tooth and making an adhesive anchorage for the gold or amalgam.

3. It is a comparatively good non-conductor, and when properly used does not irritate the pulp through thin walls.

4. It greatly adds to the strength of the tooth, because less undercut is required and because of its adhesiveness.

5. If used in a thick enough layer it reduces, if it does not prevent, the discoloration of amalgam. In the case of gold at least, and generally in the case of amalgam, there should be no cement on the enamel-margin.

6. By reason of less cutting and undercutting this method greatly reduces the pain of preparing cavities, even those of the rectangular form.

7. And last, but not least, with busy men this method is a great saver of time; in particular in gold fillings, since about one-half or two-thirds of the filling can be packed by hand pressure while the cement is setting.

Having given the principal advantages of this method, I will next consider several objections that have been urged against it.

First. It is claimed that all cements are more or less permeable by the fluids of the mouth. This objection I propose to answer not so much by arguments as by facts resulting from observations of the conditions found under fillings. These I will give later.

Second. That all cements being soluble in the oral fluids, they are not sufficiently permanent to be part of a permanent filling. This objection can be met in the same way as the preceding one,—namely, by facts resulting from observation of the conditions found under fillings.

Third. Experiments in the laboratory may seem to damage this method, but, without questioning the results of such experiments, I must still insist that they are not well sustained by the conditions actually found under fillings.

Fourth. A fourth objection, that this method leads to careless and rapid operating because of its facility, need hardly be considered by careful and conscientious men. I am reminded at this point of a late meeting of the National Dental Association, where a dentist, recently somewhat prominent, announced with no little flourish the discovery of the permeability of cement. For my part, I had always thought this point so obvious that I had taken it for granted. Solubility and permeability are, of course, not one and the same thing, but the former could hardly exist without some degree of the latter. Solubility in some degree has always been so well known that insolubility has become the supreme quality claimed or sought by all dealers and manufacturers. Let us hope they will not seek in vain. In short, the objections are more due to the limitations of the operator than to the limitations of materials. If to the cohesiveness in the materials we can add adhesiveness of the filling to the cavity-wall, we may justly claim a *coherency* in the entire operation that has heretofore been conspicuous by absence. To sum up, all materials are more or less permeable, but as cement, though somewhat soluble, tenaciously adheres to the tooth-walls, as well as to the amalgam or gold, it can be truly said to make a moisture-tight joint, and is therefore practically impervious as

regards the cavity-wall, and relatively insoluble. It is presumed that all have observed the two familiar facts,—namely, that in filling with cement alone the material clings to the wall till the last particle is gone, and that therefore under such fillings re-decay does not occur until the cement is entirely destroyed. In other words, the best quality of sticky cement gives the best possible protection to a thoroughly dried dentin wall. Of course the cement is not supposed to extend over the enamel border, which in the case of gold, at least, must be protected by more or less *direct* packing of the filling.

The last objection leads me to remark that the highest success by this method cannot be obtained without the utmost care and precision in each step and in every detail of the operation. Though the essentials to success are familiar to all who have practiced this method properly, they are important enough to require repetition:

The cavity should be prepared so as to conform to the basal principles and requirements as to separation of tooth-structure and contour of filling, retaining form in the cavity, bevel of border, and room for the free use of instruments; but, in addition to these, there must be perfect dryness, obtained by the application and evaporation of carbolic acid and alcohol, equal parts, and afterward of pure alcohol. The parietes of the cavity should then be *lightly* touched with the fluid that comes with the cement, but for obvious reasons this should not be applied directly over an almost exposed pulp. And in any case the least excess of this fluid should be absorbed with cotton.

A sticky cement should be chosen and mixed thoroughly and quickly, and quite thickly in many cases, especially for amalgam. With gold, any too great excess in the cavity will be found to be a detriment. The cavity should be merely lined or one-fourth full.

The gold should be prepared from halves or thirds of a sheet, rolled and cut into pellets to suit the length or width of the cavity. For packing I prefer a double-end plugger, with a heavy handle. When the cavity is one-half or two-thirds filled, fully five minutes, and often more, should be allowed for the cement to set before finishing the filling.

Next remove all cement from enamel walls, and then condense and level up the surface of the gold with an automatic mallet, though of course a hand mallet answers the same purpose. But for completing all fillings I have a decided preference for the electric mallet, for the reason that with it I can get a better adaptation of the gold to the enamel walls, including the ultimate margins. I will digress for a moment to add that I am convinced from what I have seen that nearly all failures with the electric mallet are due to the long, heavy blow that nearly all use when they begin with this mallet, and by which the patient is tortured and the operator disgusted. I find that a blow about one-fourth the possible length is amply sufficient. Most of my patients prefer the electric to any other mallet, and I use all the approved kinds to meet conditions and preferences. When the blow of the electric is a mere vibration, and the mallet is used but ten to twenty minutes in any case,

the maximum of good results is secured with the minimum of discomfort. I have seen some of our best men use this mallet by the hour, and I am convinced that our Webbs and Browns used it too exclusively in all parts of all fillings; and the interminable "clitter-clatter" became a heavy and needless tax on many a high-strung, nervous patient.

In the malleted portion of the filling I use ribbons exclusively. In the hand-pressure portion of the filling quickness and accuracy in placing and packing the pellets at the ends and around the floors of the cavity determine the success of the entire operation. Some of the first pellets may move, but as long as the cement is soft they can be perfectly replaced, and will hold as securely as if not disturbed at all. In a cavity with walls all around, and with the cement mixed thick enough, each pellet remains just where it is placed. In a long, shallow cavity it is always best to make two mixes of the cement, one for each end. In building on a corner deeply anchored a very little cement may be used in starting, but none should be used in the anchorage at the cutting-edge of the incisors.

III. *Practical Cases.*—I have used this method with gold and amalgam for about ten years, and as examples of its reliability, as well as superiority in most cavities, I have selected the following typical cases in which fillings have been in from five to ten years, as well as some that have broken away much sooner, thereby giving me a chance to inspect the work in all its parts.

Case 1.—Mr. M., with very large and thick but "cheaply put together" teeth, with very large cavities and thin walls. I filled the upper bicuspid and incisors on all approximal surfaces, first using a liberal quantity of cement and then amalgam, even in the palatal parts of the canines, facing with gold all fillings that were exposed to view. After seven years I find no re-decay, though some edges of cement are clearly seen, and the gold margins over the amalgam are a little bluish and imperfect. The thin line of cement when examined with a glass makes a much better showing. The teeth bear marks of vigorous use and a fair degree of care.

Case 2.—Mrs. C. All molars and two bicuspid gone, and occlusion almost entirely on front teeth. The upper incisors are thin, narrow, and frail, and all decayed from gum to cutting-edge, and walls very thin or broken away, but all teeth still living. In these long, shallow cavities, with thin walls and slight anchorage, I put gold fillings, which were largely retained by cement linings. In about two years two of the fillings were forced out, carrying some cement and the outer walls with them, and leaving some cement, dry and flint-like, closely adhering to the floor of the cavity. One pulp had to be destroyed; the fillings were replaced, and are still retained. After carefully examining these two failures I was convinced that without cement these fillings could not have been retained nearly so well, nor would the pulps have been so well protected. The adhesion of the cement, both to the tooth and the gold, as well as its hardness and comparative dryness, tells its own story. There was evidence of undue force on these fillings, which accounts for their displacement. The others are doing fairly well.

Case 3.—Miss M. Similar to preceding as to size, number, and position of fillings, but the teeth are thick, somewhat crowded, protruding, and lacking in density, with the posterior teeth all in position. The teeth contained a number of leaky fillings, shown by the bluish, unsightly color. The patient was anxious to have the protrusion corrected, and, if possible, the teeth made smaller. I did both by trimming away each approximal surface, which made some of the cavities quite shallow. I next filled these fan-shaped, rather large teeth with cement and gold, leaving space enough between them to admit of their being drawn back till they touched the lower teeth.

Most of these cavities were so shallow, the pulp so large, and the dentin so sensitive that I was almost forced to depend mainly on the adhesion of the cement on the rather broad floors of the cavities for anchorage. After six years the fillings are intact, the margins good, though the cement comes nearer to the borders than I had intended it should; in fact, a thin line shows in several places.

In the same case the distal surface of a bicuspid was gone, leaving an almost level surface, without walls and very sensitive. After a rather imperfect preparation, medication, and thorough desiccation, with a sticky cement and amalgam I restored the approximal surface to its original contour. I cautioned the patient not to expect too much of the operation, for I felt very uncertain as to its permanence. With a normal occlusion, the filling is still there after more than six years of service. (I lately found that this case had failed, being undermined by a deep cavity on the opposite side of the tooth.)

Case 4.—Mr. K. This case illustrates the density, durability, and adhesiveness of cement under amalgam after eight years. The amalgam was undermined by re-decay along several margins where there was no cement, and the case came into my hands for refilling with gold. On removing the amalgam from these soft and imperfect teeth I found re-decay just where there was no cement,—along the walls,—while on the floor of the cavity the cement was so flinty and closely adherent that I had to remove it with a spear-pointed drill. I prepared in the usual way, and filled these four large approximal cavities with cement and gold; and I shall be doubly interested in watching this case and recording its history.

Case 5.—Miss M. A case came into my hands which had failed, a second and third molar still vital and with entire occlusal surfaces denuded of enamel, without walls, and with very little undercuts of the most shallow kind in very sensitive dentin. Crowning was hardly advisable or available, so I cleansed and dried the surfaces thoroughly, restoring them with cement and amalgam. After a year the fillings are still there, though the previous fillings had been shed in a few months. But it is needless to say that their history is still to be written, and I will add that the reputation of a prophet might be poorly invested in these same fillings, even though I did the best I could under the circumstances.

As I have said, I use this method in all except very small cavities and most corners on front teeth. It has not such a high degree of

merit, except speed, in hard or dense teeth as in those below the average in density. Without discussing the quantity or quality of calcium salts such teeth, or any teeth, contain, I will simply say that I regard this as the method *par excellence* for "cheaply put together," and therefore more or less perishable, teeth. With such teeth, perfect dryness, and a good sticky cement one can fill even the softest of them with gold with a good conscience and confident expectation of success; and the "all-gold" man and the "commercially minded" man will be able to render better account in every sense of the "day's doings."

I might say, finally, that I notice lately some strong claims made for the durability, as well as good color, of fillings made by mixing cement and amalgam into one mass before placing into the cavity. I doubt not the claims are well sustained, because based on experience in the mouth,—the only thing that entitles any one to an opinion worth recording.

ARE THE MORBID PROCESSES VARIOUSLY DESIGNATED "INTERSTITIAL GINGIVITIS," "PHAGEDENIC PERICEMENTITIS," ETC., INFLAMMATORY OR NECROBIOTIC?

BY GRANT MITCHELL, D.D.S., PITTSBURG, PA.

(Read before the Pennsylvania State Dental Society, at Reading, July 5, 1900.)

A COMPREHENSIVE presentation of conditions that cause loosening of the teeth is prevented by the traditional limitations of an occasion like this. I shall endeavor, however, to set before you the views I entertain as clearly as the brevity of the opportunity and the necessary omission of many interesting references and facts will admit.

The preclusion of certain citations and details may give my paper an unsupported and pretentious sound, but those who realize that we have been groping for many years without coming nearer the goal than an occasional delusive and temporary arrest of pathologic manifestations will recognize the magnitude of our subject and the difficulties of canvassing in a single essay that which for a hundred and sixty years has engaged the attention of our ablest investigators.

Nearly two centuries of arduous investigation, resulting, as far as I am able to ascertain, in an occasional change of label—more or less descriptive of some of the visible aspects of the disease or its presumptive pathogeny—and the deplorable conclusion that "exfoliation is only a matter of time." (Talbot, "Interstitial Gingivitis," page 179.)

It may not be altogether improbable, however, that inferences drawn from the scrutiny have been erroneous; that symptoms exhibited in late stages of the disease have been mistaken for causal manifestations, and hence the treatment employed could lead, naturally enough, to the deduction above quoted.

Dr. Talbot says that much has been written during the past two

decades upon the pyorrheic stage, and the treatment of what he denominates "interstitial gingivitis." "But," he continues, "no new principle has been advanced whereby the parts can be restored to a healthy condition, or whereby the disease can be prevented. The disease is admittedly on the increase. This seems at first sight to indicate that dental prophylaxis and treatment, so far as this disease is concerned, is a failure." And, as if to bear out the assertion, almost the concluding sentence in his recent and elaborate contribution to the literature of the subject is, "If the tooth or teeth cannot be retained perfectly tight . . . the sooner the loose teeth are removed the better."

The history of this disease is too discouragingly monotonous to commend itself to us for even a brief rehearsal,—beginning as it does early in the eighteenth century with a description of all its essential features and principal symptoms, and ending at the close of the nineteenth with the statement that "liberal use of iodine, or iodine and aconite and the gum massage brush is all that can be done to reduce the inflammation and absorption *as much as possible*." (Talbot, *Ibid.*, page 179.) A majority of the writers, however, class the disease among inflammatory affections, with a preponderance of opinion in favor of a "constitutional origin,"—a sage but not difficult conclusion to reach, since all disease manifestations which are not obviously the result of traumatic injury or specific poison are presumed to find origin in the failure of some function or functions of the organism to be carried on normally. But that it is inflammatory in its expressions I am not prepared to concede.

Of the multiplicity of lesions manifested in the gums and alveolar investments of the teeth there are three particular kinds with which every observant dentist is familiar,—at least with their visible aspects. These three sorts are similar in some of their characteristics, and occasionally in their terminations. But they differ essentially in etiology and in genesis of the disease process.

The first of this group seems to be but a simple recession of the gum and alveoli from the necks of the teeth, without manifesting any symptom of disease other than wasting of the tissues. The gum remains healthy in color and firm in texture, offering to the casual observer the impression that a too vigorous use of a stiff brush is at fault in producing the phenomena. But the close adherence of the gum to the roots of the teeth, the uniform recession of the borders of the process, and the total absence of inflammatory expressions do not warrant such an assumption, more especially since a change to softer bristles or a less muscular application does not seem to yield a preventive influence. This sort of recession, which may properly be described as *simple atrophy*, is a very gradual process, and infrequently if ever do the teeth become so loose that their movements in the sockets excite inflammatory reactions, with possible suppuration. It is probable, too, that a majority of the patients exhibiting this condition are of those temperaments whose basal attributes are strongly *nervous*.

The second and most common form of ailment is that induced by the precipitation of calcareous salts at the cervices of the teeth, the

gradually increasing accumulation of which exerts mechanical irritation, producing gingivitis and causing a more or less rapid and irregular absorption of the gum and alveolar process, until finally the teeth loosen and, becoming an added irritation by their motion, a corresponding inflammation in the deeper tissues ensues, with resultant pyorrhea. Temperament seems to play no especial part in this manifestation, since it is about equally observable in all grades and shadings. This condition, for a long time known as "Riggs's disease," is the form amenable to treatment by instrumentation.

The third and apparently the most hopeless pathologic expression—the one with which this paper has more especially to deal, and which is of by far the greatest interest to us as doctors—is that form in which, although the general physical condition is to all appearances robust, a disease process is manifest in the alveolar investments from the beginning and is continued without necessarily traumatic injury, external irritation, or specific poison; in which there is always a degeneration and disintegration of the alveolar supports of the teeth,—beginning at the cervical borders,—but not necessarily a loss of gum tissue; in which there is usually a discharge of pus from the gingivæ, but by no means invariably so; in which the gums frequently appear as if congested (due to sluggish, atonic circulation), but often maintain a healthy hue; and in which no sign of *inflammation* manifests itself until the disease is far advanced and the loosened teeth themselves have become a source of irritation by their very tottering, when, and not until then, are inflammatory symptoms expressed. This phase of morbidity is, like the preceding one, more or less common to all of the temperaments, but a predominance of its exhibitions will be found among those types having a marked lymphatic base.

It is rarely, though occasionally, noticed in youthful patients. It usually manifests itself after the age of twenty-five, reaches the stage of greatest anxiety about thirty-five to forty, and the "superlative degree" (loose, looser, loose'em) between forty-five and sixty.—sometimes sooner, seldom later.

A wide range of theories have been advanced relating to the causes of this condition, but, to the best of my limited knowledge, one alone is recorded which seems to suggest the true etiologic factor engaged in producing the phenomena. Dr. Clowes, in 1879 (*DENTAL COSMOS*, vol. xxi, page 521), suggests that "a more general cause than all others is the lack of nutrition in the parts." But, unfortunately, Dr. Clowes became entangled in the branches of the beautiful simile he employed, and forgot to explain the processes of nutrition or the reasons for its frequent failure, and thus his suggestions came to naught so far as dental practice is concerned. It is my desire to-day to submit some substantial reasons for entertaining conclusions identical with those of Dr. Clowes, though independently drawn, and perhaps to offer some practical hints in relation to the nourishment of parts undergoing abnormal katabolism. And, if I may be pardoned for adding one more to the already formidable list of sesquipedalian terms which

distinguish this disease, I shall refer to the condition hereafter as *necrobiosis*, for the reason that this seems to be the designation most fitting. It describes the processes at work more accurately than any other.

As Dr. Talbot justly remarks, apropos of the erroneous title, pyorrhea alveolaris, "While even erroneous titles may have their meaning so fixed by usage that any danger from the error involved in the title may be practically *nil*, still this is not the case with the title just cited. It suggests erroneous etiology, since pyorrhea implies that there must always be a flow of pus, and hence that the disease must always result from infection with pus microbes. It implies erroneous pathology, and erroneous treatment for the same reason. This being the case, such a title is so dangerously misleading as to compel in the present stage of dental science its complete disuse." (*Ibid.*, page 10.)

"With the view of clearing up this question at the outstart" I will observe that the above quotation aptly applies to the designation chosen by Dr. Talbot. Interstitial gingivitis suggests erroneous etiology, because the term implies that there must always be an inflammation of the interstitial tissues, and hence the disease must always result from the action of an irritant.

Ashhurst ("Principles and Practice of Surgery") says (and I lay particular stress upon this definition, because the notion stated in the opening sentence seems still to prevail in the dental mind): "Inflammation was formerly considered as a disease, an entity, a something superadded to the natural condition of the part. This view is now almost universally abandoned, and authors, though differing as to the proper explanation to be given of many of the phenomena of inflammation, are, I think, generally agreed that those phenomena are mere modifications of the phenomena of natural textural life. These changes, which are *always due to the action of an irritant, no matter whence derived*, may be observed as affecting the phenomena respectively of function, nutrition, and formation, and in each the changes are primarily in the direction of excess."

Irritants which excite inflammation are mechanical, chemical, or electrical actions, thermal changes, and the influence of parasites. Probably the largest proportion of causes are from external agencies, but inflammatory excitants may also be found within the body. Microbes may penetrate the tissues and produce substances the action of which induces inflammation, or the death of tissues may cause inflammation, and occasionally disturbances of the processes of assimilation (as in gout) cause abnormal products of metabolism to be deposited in the tissues.

I am of the opinion, therefore, that Dr. Talbot should either modify his designation of this disease or admit that Professor Peirce or Professor Black—both of whose theories he assails with especial violence—is correct in his etiologic conception. Either the *inflammatory condition of the gums*, which he (Talbot) conceives as the pathologic process involved, is due to the deposition of calcium salts (ptyalogenic or hematogenic) of Peirce, with the

occasional presence of uric acid, or the "specific infection" of Black must be the excitant, or the so-called inflammatory condition of the gums is *not an inflammatory condition*.

Patterson and Sudduth describe the disease as secondary catarrhal stomatitis, while Black, Peirce, Kirk, and many others believe it to be an inflammation of the pericemental tissues; all suggesting erroneous etiology, erroneous pathology, and erroneous treatment, because none of the symptoms of inflammation manifest themselves in the early stages of the disorder. Our attention is rarely directed to the condition until the disease has developed so far that some of the teeth have become alarmingly loosened, and this without the patient's cognizance.

At the beginning of the Christian era Celsus enunciated *rubor, tumor, calor*, and *dolor* as the cardinal symptoms of inflammation, and for nearly two thousand years these have been regarded by physicians as the true indexes. Not one of these signs or symptoms manifests itself in the incipency of the processes involved in loosening the teeth, and hence the condition cannot be *pericementitis*. With regard to the term *necrobiosis*, Billing (Medical Lexicon) defines it as the "slow death of a part due to tissue degeneration." Stengel ("Text-Book of Pathology") differentiates between *necrosis* and *necrobiosis* thus: "Necrosis may be defined as death of tissues, necrobiosis as death of individual cells." Ziegler ("General Pathology") says, "When death of a tissue supervenes quickly upon the infliction of an injury, it is called *direct necrosis*; when it occurs slowly and is preceded by degenerative changes in the tissues, it is termed *indirect necrosis*, or *necrobiosis*." And Virchow ("Cellular Pathology"), to whom credit is given for the first proper employment of the term, says, "We have here to deal with a gradual decay and death, a dissolution; we might almost say a *necrosis*. But the idea of necrosis does not offer any analogy to these processes, inasmuch as in necrosis we conceive the mortified part to be preserved, more or less, in its external form. Here, on the contrary, the part vanishes, so that we no longer perceive it in its previous form. We have no necrosed fragment at the end of the process, no mortification of the ordinary kind, but a mass in which absolutely nothing of the previously existing tissues is preserved."

One could almost imagine that the eminent pathologist had a typical case of loosening teeth in view when he gave utterance to that exact description. And hence my preference for the term *necrobiosis*.

Let us now outline, as briefly as possible, the nature of vital forces.

Formation and nutrition are carried on by cell action. The function of the bloodvessels is to bring new material and remove that which has become effete. The force which animates the cell is the bioplasm, estimated by Beale to be not more than $\frac{1}{100,000}$ of an inch in diameter, and of this ninety per cent. is water. The lowest manifestation of vital activity is in multiplication and growth. The highest manifestation is in specialization of function, or the formation and elaboration of delicate and complicated tissues. With in-

ception of life the bioplasm begins to die, transmitting its powers to other living matter which comes into existence at the instant of its death. This new living matter is evolved out of the nutrient substance in solution and circulating in the interstitial fluids, and is taken up by the bioplasm, with which it comes in contact; is vitalized and endowed with all of the powers of the parent bioplasm, which then dies and is converted into formed tissues of the kind determined by its nature. This process is a ceaseless succession throughout the life of the organism, and the maintenance of a normal condition of the organs and tissues of the body is dependent upon the free circulation and the components or character of the nutrient substance in the interstitial fluids. Moreover, if a break occurs in this succession it is forever irreparable, and the utmost endeavors of man and nature can result only in the formation of a lower-grade—cicatrical—tissue.

This outline is sketched hastily, and with exceeding imperfection, but bear it in mind, as we shall refer to it again.

To recount the interferences with vital processes which affect and prevent the elaboration of structures without hindering the lower manifestations of biologic activity—multiplication of cells—would, I imagine, require more time than you would willingly give constant ear to, sitting on uncushioned seats. But I am of the opinion that a majority, if not all of them, are, in their incipency at least, manifested *in utero*,—that they are hereditary. And, although we are not definitely familiar with the process of hereditary transmission, it cannot be a strain on the imagination to suppose that bioplasmic similarity in nerve cells, in muscle cells, or the cells of whatever tissues, are practically the same throughout generation after generation. And as it is possible that this bioplasmic similarity, if I may so use the term, transmits to children the features of their parents, so may it be possible that internal organs or structures will bear a similar *structural* resemblance to those of a progenitor in exact correspondence with the vital possibilities of the bioplasm transmitted.

I believe, therefore,—and I have never known more than mere assertion to be offered in confutation,—that every person born in this world inherits, in the manner above hinted at, a structural tendency or predisposition to a condition called disease in some organ or organs. This structural predisposition manifests itself variously in different individuals subjected to identical causes,—*e.g.*, a number of persons exposed to damp air, perhaps sitting in a draft. One will exhibit as a result a “cold on the chest”; another develops catarrhal manifestations in the nose or throat; others will show marked symptoms of rheumatism, and others still complain of inflammatory expressions in the stomach, bowels, kidneys, pleura, etc. And yet others, again, may be exposed to this same dread *cause* of disease with impunity, only to suffer later from fevers or ailments not at all *caused* by damp drafts, but dependent none the less upon an hereditary structural predisposition in the part affected.

The fact that no progenitor had a particular form of disease, even though he lived well past the period at which such disease

usually manifests itself, does not disprove a bioplasmic or structural predisposition to that disease. Rather does it suggest that the conditions which develop it had not acted long enough or with sufficient energy, or perhaps the ancestor happened not to be exposed to the necessary exciting cause.

Let us observe, further, that structural predisposition to disease extends to all of the tissues of the body, even to the alveolar investments of the teeth. Perhaps, if time would allow it, some profitable speculation might be indulged in with regard to the probable relation between the normal, physiologic predisposition to atrophy in these structures and the pathologic or necrobiotic processes which have excited so much activity among dental nomenclators.

But our time is already overfilled, and we have not yet reached our main conclusions. Let us push forward.

Having given emphasis to my belief in an hereditary *structural* predisposition to disease, it now remains to trace the evolution, or perhaps a better expression is the involution, of pathologic development. We have observed that the maintenance of a normal condition of the tissues of the body is dependent upon the free circulation and the character of the nutrient substance in the interstitial fluids. Dr. Talbot and others have shown us how, through degenerative changes in the oral arches, due perhaps to modern culinary methods, with a corresponding disuse of the dental organs, the circulation may be interfered with in the alveolar structures. But a consideration that is of vastly more importance is to be found in the incapacity of the average human stomach to properly perform its functions, because of the suicidal abuse heaped upon it. We will not discuss the physiology of digestion, but we wish to make it clear, in a single sentence, that when normal digestion of food fails to be accomplished, from any cause, decomposition of the more readily putrescible elements takes place. And I know of no cause of failure in this direction as common as or more effectual than incessant milking of the glands which furnish the digestive juices.

There are probably few gentlemen within sound of my voice who can pass a cracker-dish at any hour of the day or night without imposing an unwarrantable task upon his digestive organs; the effects of which, when persisted in, even from the years of childhood to maturity, is manifested sooner or later in the passive if not the active forms of pathologic processes. Constant nibbling—an occasional cracker, a bon-bon, an orange, an apple, between regular meals; evening parties, with salads and salted nuts; midnight lunches, etc.—so exhausts the glands of the stomach that in time even the light meals we are driven through digestive weariness to resort to fail to excite a normal activity. And it follows, as a matter of course, that nutriment derived from food partially digested and partly *decomposed* cannot be of a character to maintain high physiologic tone in tissues whose resistance to disease is impaired from heredity. I am fully aware that all this is not new; that it is but the A B C of physiology. But I am not so sure that many of our brethren do not take up the practice of a scientific profession with these A B C's imprinted as indelibly on their cuffs as on their

sense of practicability. And for their sakes I risk wearying you with the recital.

The processes which take place in the cells of the alveolar structures undergoing necrobiosis are, in the beginning and well toward the development of the condition, essentially *passive*, and find origin in the first failure of the organs of digestion to act completely, with consequent imperceptible but certain loss of tonicity in the blood, and naturally first exhibited in structures that are weakest from hereditary causes. The development of the condition is at first slow, until it reaches a point where the cells begin to die and the gingivæ to detach from the alveolar walls. The progress then becomes more rapid, because of certain complications which will be explained later, and the teeth loosen. Frequently calcium salts are deposited in the tissues, accelerating the death of cells by pressure and hastening the loss of the dental organs which depend upon these structures for support. It is well understood among general pathologists that morbid deposition of calcium salts takes place in tissues that are either already necrosed or are "seriously stunted in their nutrition." Zeigler ("General Pathology," page 188) says: "The cause of calcification is for the most part to be found in local changes in the tissues, since the deposits of lime salts usually occur in localities in which the tissue has already died or is in process of degeneration and necrobiosis." Litten affirms, according to Zeigler ("Text-Book of Pathology," page 97), that "calcification depends on a necrotic modification of albumin, possessing a special chemical affinity for lime salts."

The process of deposition is not one of simple precipitation of the calcium salts and retention of them by the tissues, but they form solid compounds with the albuminoids, varying in consistence from chalky to flint-like. These deposits consist chiefly of the carbonates and phosphates of calcium, with a small quantity of magnesium salts. Also, in the gouty diathesis, deposits of urates—principally the urate of sodium—may be detected in the combinations.

This is roughly the process of calcic formation from calcium salts in solution in the blood.

Another form of deposition of interest to us as dentists is that in which the calcium salts are precipitated from the saliva, and become attached to the necks and surfaces of the teeth. This form is so common that were it not for the frequent harmful effects resulting from its accumulation it might pass for a normal manifestation. It is discovered, to a greater or less extent, in mouths of all states, from the slightest departure from physiologic tone to manifest pathologic conditions. Its accumulation may be accounted for in the following manner: The secretions in mouths exhibiting this tendency are more or less sluggish and viscid; the surfaces of the teeth are constantly bathed in these, which, with the mucous secretions, agglutinate particles of food, dead epithelium, etc., at all points not especially protected by the process of friction. These agglutinated particles become saturated with saliva, "an alkaline fluid characterized by the presence of a peculiar albuminous substance called *ptyalin*, which easily putrefies" (Bloxam), and, as we

have seen that "necrotic modifications of albumin" possess a special chemical affinity for calcium salts, precipitation from the saliva is readily accounted for. The presence of *leptothrix buccalis*, even in large numbers, and occasionally other micro-organisms, in these deposits is not believed to contribute to their production. If these statements be correct in regard to the formation of calcareous deposits,—and I submit to you whether they bear the marks of plausibility,—then it follows that the deposition is concomitant in the necrobiotic processes, and not causal.

Both forms of deposition, however, tend to complicate the necrobiotic condition, and I suggest that the terms proposed by Peirce, *hematocalcic* and *ptyalocalcic*, are appropriate and expressive in distinguishing between the two varieties of complication,—for they are dissimilar, at least in the respect that depositions from the blood are dependent upon and always preceded by the necrobiotic condition, whereas precipitation from the saliva may be, and usually is, quite independent of this manifestation.

A condition somewhat resembling circumscribed gangrene, in that it presents marked pyorrheic symptoms, is frequently manifested in conjunction with alveolar necrobiosis. This is due to the fact that the "pockets" formed by the detachment of the gums from the gradually dying alveolar process become filled with a highly putrescible matter and are easily entered by septic bacteria, which rapidly multiply in the abundance of nutrient media thus afforded for their growth. They are in no wise a cause of the condition, however, for upon extraction of the teeth in the affected region physiologic atrophy, which is a more rapid process than necrobiosis, deprives them of the media upon which they thrive. Whereas if bacteria were a causal agency it would appear that, an entrance once gained, so simple a process as the removal of a tooth, upon which they evidently do not depend, could effectively put a stop to their further ravages.

Much could be said in disproof of existing theories and practice concerning the pathogeny and etiology of this disease, but we leave the results of treatment based on these to tell their own story. It is the aim of this paper to discuss what, according to my conception, the processes really are. And I am firm in the conviction that the etiology and genesis is, as has been described, hereditary diathesis plus untimely feeding. I believe this because the treatment employed restores the parts to as healthy a condition as possible where absolute loss of tissue has resulted, and prevents the further progress of the disease. Moreover, those who follow the directions prescribed are improved not alone with respect to this disease, but in every other direction which suggests pathologic tendencies.

The treatment of the condition, which I trust has been set before you in a fairly comprehensible manner, consists, first, if indicated, in removing all mechanical complications in the nature of calcic deposits, bacteria, and the dead, putrescible contents of the pockets by gentle instrumentation and syringing with soothing antiseptic solutions (and for this especial purpose I have found nothing to

excel phenol in solutions of varying strength with water as hot as can be comfortably borne). I am especially careful to avoid irritating force, either in dislodging deposits or expelling the contents of the pockets. The next step comprehends fixation of the loosened teeth. This is accomplished in the manner indicated by the case in hand, and ranges from silken ligatures to filling in gold wires at the incisal edges and occlusal surfaces, or the adaptation of a succession of gold bands.

If ligatures alone are available the patient should be instructed to come monthly for renewal, and should be provided with an agreeable mouth-wash, such as borolyptol, for example, to prevent the ligatures from becoming offensive. If either of the other devices are employed it is only necessary that they come every two or three months to have the deposits removed, until the abnormal tendency to accumulate ceases.

The patient, then, should be instructed minutely in the avoidance of untimely eating. Explain the effects first upon the glands of the stomach, then upon distant organs in which exists a pathologic diathesis. Prescribe no especial form of diet, nor interdict particular kinds of food; but lay great stress upon the necessity for giving the stomach an absolute rest for a few hours each day, that the glands may recuperate and be ready for the excitement of needed meals. Aim to convey a clear idea of the difference between *hunger*, which is a natural call for food to restore tissues consumed by exercise, and *appetite*, which is but the craving of habit, and equally vicious whether it be for narcotics, alcoholics, or foods at unseasonable hours. Point out to them that sufficiency of nourishment is not dependent on bulk of food, but upon the capacity of the stomach to completely digest that which is eaten. And strive to convince them that the feeling of repose which follows a well-filled stomach is but the first stage of torpor instead of an accession of strength, as is usually supposed. Call their attention to the fact that food must not only be completely digested, but assimilated, before strength is experienced therefrom; and show them that the imaginary weakness sometimes experienced when the stomach is nearly empty is of a sort with the "discomfort" experienced by an habitual drinker when deprived of his dram for a period exceeding his wonted habit.

When it is possible to do so, it may not be amiss to have your patients adopt Dr. Dewey's method of deferring the breakfast until exercise has created a necessity for food, explaining to them that a "restful sleep is not a hunger-producing process," and he who breaks fast immediately upon arising from slumber simply converts the stomach into a "dinner pail" to carry around with him that for which nature has no instant need. Tell them that with the first awakening to the light of day every movement of mind and body is a destructive force which, if continued without cessation, would soon lead to death; that so considerable is this destruction during the course of each day that nature has set apart nearly a third of our lives for reconstructive purposes; that when we sleep—when body and mind are in repose—the wastes of the day are repaired.

Hence there cannot be the need of nourishment in the morning as at the close of the day, when exercise, mental and physical, has exhausted the store. And though a desire for food may exist, as the result of habit, it cannot cause the same excitation of the gastric glands if eaten as if it were a necessity, and therefore its digestion is slower and less perfect, and a greater likelihood of decomposition of the easily putrescible elements exists.

Furthermore, impress upon the afflicted ones the utter hopelessness of their condition if they are addicted to the use of alcoholics, even moderately; and decline any responsibility in the matter of directing treatment for them if they are unwilling or unable to abstain from this habit. Show them that alcoholics, when taken into the stomach, act as irritants to the delicate mucous lining, causing a congestion of the capillaries, distending their walls and producing a strangulating pressure upon the intervacular tissues, enfeebling the muscular action of the stomach and diminishing, if not suppressing, the functional activity of the glands. And in direct proportion as this is continued will it prolong disease processes, for no part of the human body can be restored to a normal condition unless the stomach be normal.

Professor N. S. Davis, of Chicago, in an address before the International Medical Congress (1887), said: "The alcoholic drink does not relieve the individual from cold by increasing his temperature, nor from heat by cooling him, nor from weakness and exhaustion by nourishing his tissues, nor yet from affliction by increasing his nerve force, but simply by diminishing the sensibility of the brain and nerves, and thereby lessening his impressions of all kinds, whether from heat or cold, weariness or pain. In other words, the alcohol by its presence does not in any way lessen the effects of the evil to which one is exposed, but directly diminishes his consciousness of their existence, and thereby impairs his judgment concerning the degree of their effects upon him." Therefore, it is wise to explain to your patients that alcoholics taken before or during a meal do not "stimulate the appetite" or aid digestion, but merely render them unconscious of the distress that would otherwise proceed from overloading already abused stomachs.

Professor Davis further said, "After an ample clinical field of observation in both hospital and private practice for more than fifty years, and a continuous study of our medical literature, I am prepared to maintain the position that the ratio of mortality from all the acute and general diseases has increased in direct proportion to the quantity of alcoholic remedies administered during their treatment." To which I may add that in a field of observation covering more than fifteen years the ratio of failures to check the progress of necrobiotic processes seems to have increased in direct proportion to the quantity of alcoholics consumed during their treatment.

Finally, urge upon your patients the necessity of exercising the teeth at proper intervals in the manner intended by nature that they should be used.

I have observed that the canine teeth are the last usually to mani-

fest symptoms of necrobiosis. I have observed, further, that children early cultivate the habit of biting mostly upon these teeth. I have noticed that the incisors are used principally to scrape food from forks and spoons, and that molars are employed to divide large mouthfuls into sizable gulps, or to pat boluses into swallowable form. And I am led to the conclusion that the extra use of the canine teeth and the perverted uses of the incisors and molars is significant in connection with delayed manifestations of necrobiosis in the region of the canines. But that it does ultimately occur in this region is confirmatory of an hereditary diathesis, and of unseasonable, unreasonable abuse of the stomach, with consequent unwholesome matter in the circulation to impair the nutritive function of the cells, as the exciting and continuing causes.

THE RELATION OF THE PULP TO THE APICAL REGION.

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(Read before the Pennsylvania State Dental Society at Reading, July 5, 1900.)

IN the treatment of caries of the teeth the pulp and apical region present considerations for their future freedom from pathological conditions. To the student of development and histology the pulp and the region surrounding the tooth-root furnish abundant material for study. To the bacteriologist and pathologist they are attractive; the pulp because it may become a focus of infection, the apical region because when inoculated with the toxin from an infectious pulp it becomes an intermediate point from which septic inflammation may find expression in near or remote parts of the economy.

If the above assertions are correct, what subject of more importance can be presented to a body of stomatologists than indicated in the title of this essay? It is not, however, the intention of the essayist to present anything new or to discuss the different divisions and phases of the subject to their completeness, but rather to make a humble effort to touch upon certain points, elucidated by others that should be indelibly impressed upon the mind of every one who has the care and treatment of the human teeth and mouth at heart and to excite an interest and a general discussion that will enable us to appreciate the fact that treatment of the teeth may be a preventive measure for many morbid conditions of the general system.

The microscope has revealed the relation of the tooth-pulp to the other tooth-tissues and also to the tissue surrounding the root, and a knowledge of this relationship requires the study of histology and function. The organ that forms dentin and becomes the medium through which it receives nourishment has its commencement in a proliferation of sub-epithelial tissue. By progressive changes this proliferation from a bud-like mass becomes inclosed on what is to be the morsal aspect of the future teeth, by the enamel organ, which, with the resistance of contact and physiological laws the organ of dentinal formation, is governed in its function for the

construction of a tooth in shape to conserve a specialized use. The pulp envelopes itself with dentin until a fully formed tooth is elaborated, containing a central chamber with an outlet at the extremity, this outlet being the portal for the transmission of vascular and neural vessels. Thus an anatomical and physiological relationship is established, not only between the tooth-pulp and the region surrounding the apex, but with the whole organism, the tooth being vitally connected with and amenable to variations of physical conditions of the body of which it is a part.

At the time of eruption of the tooth the pulp is still performing the work of inclosing itself in a tenement of dentin at the apical portion of the root, and the tooth is not to be considered fully formed until the apical aperture has been reduced in size. At just what age the calcification of the different permanent teeth is completed it is difficult to determine, or whether it can be said a tooth is fully calcified until the individual has reached that period in life when the pulp no longer can perform its normal or special act, as through life, until the commencement of senility is reached, the dentin has its periods of growth and cessations due to intrinsic and extrinsic causes.

Without discussing whether the density of dentin varies after its formation clinically, there appears a difference in its character in the teeth of persons as they present themselves for treatment from time to time, and from observation a rational conclusion suggests itself that this variation is due to certain interferences in the normal physical process. As instance, a mother after parturition, and perhaps while still furnishing nutrition from her own system for the offspring, presents herself as a patient. The dentin does not have the same ringing sound when cut with an excavator that was observed before the maternal duties were undertaken; the interglobular spaces are easily entered; the decay is erratic, in that it progresses more rapidly in some directions than in others; pulps under former fillings are more or less disturbed, and the teeth tender upon percussion. The teeth of patients who have passed through sieges with typhoid, intermittent, malarial, rheumatic, and other debilitating fevers will be in similar conditions, and often pulmonary consumptives will have teeth undergoing rapid molecular disintegration. When, however, an harmonious action of the various tissues and organs is maintained, or regained if having been interposed by inharmonious behavior, we find both enamel and dentin resistive to cutting instruments; the pulp responds more promptly to conservative treatment, and our efforts are rewarded with gratifying results.

The crowns of the deciduous teeth are almost fully formed at birth, and, unless the mother's health is depressed and the power of supplying nourishment to the fetus lessened, the calcification of dentin and enamel will not be interfered with. After birth the calcification of the roots progresses, and the functional act of the pulp will be in consonance with the nutritive and assimilative powers possessed by the infant. This physiological process continues until the child is about two years of age, when it is apparently arrested,

to be followed by another but more obscure one,—that of decalcification or absorption of the roots preparing for their exfoliation and the eruption of the permanent teeth. It is difficult to definitely state when this period of decalcification commences. It is a manifestation of the evolutionary process in the individual, and is one of the means by which the various functions of the body are exercised, and helps to constitute the science of life. It is the beginning of a preparation for a more extended masticatory apparatus to subserve the purpose of a being requiring different food and in larger quantities. Its physiological action is obscure, our knowledge of it being still in a hypothetical stage; but generally it is accompanied by three conditions,—a vital pulp in the deciduous tooth, the period when a permanent tooth should be advancing, and, when under the guidance of normal development, the commencement is at the apical extremity of the root. That it is accompanied by a vital pulp is demonstrated by the decalcification ceasing when by any means the dissolution of the organ takes place.

The presence and pressure of the growing permanent tooth plays no part in the molecular dissolution, as often the bicuspid will be tightly impacted between the roots of the deciduous molars or the incisors and canines of the permanent set wedged closely to the side of the corresponding deciduous teeth, and perhaps are being directed away from their true position in the jaw by the undecalcified roots and their alveolar attachment. The permanent tooth may never be developed, yet the root of the deciduous tooth will be absorbed and the crown thrown out as usual in the period of second dentition. A hypothetical explanation of this interesting physiological process is the functional relationship between the pulp and the tissues of the apical region.

The process is a metamorphosis, a structural change in the developing being, the cells of the pulp and of the tissues of the root degenerating and passing away simultaneously, the cells of destruction furnished by the tissues at the apical region seeming to be unable to be propagated unless the pulp be present in the tooth that has reached its full period of usefulness and commenced its decline. This might lead to a belief that a certain physiological condition had been attained in the two regions, interdependent one upon the other, for the purpose of removing from the body a useless organ to make way for another more capable of performing a function for a more highly developed being. The tissues of the apical region are giving way for the occupancy of the permanent tooth, and with the disintegration of the pulp and root of the deciduous tooth nourishment which had been appropriated to them is now diverted to the permanent successor.

The relation of the pulp to the apical region is thus evident in the normal function of organic beings. It is no less interesting when modification of function and change of structure caused by disease are brought to our notice.

During the time the apical portion of the root of deciduous teeth is incomplete, if caries have made sufficient progress to expose the pulp it is highly improper to resort to devitalization by arsenous

acid, as in close proximity to the calcifying root lies the papilla, the rudimentary pulp of the permanent tooth. At the period of root-decalcification the same treatment is contraindicated, as the contiguous tissues of the periapical region may be affected by arsenical poisoning. In the permanent teeth during the period of calcification it is unfortunate if pulp-disturbance be such as to render devitalization and removal of the organ obligatory. If arsenous acid be the devitalizing agent used apical inflammation is likely to be produced, as the inflammatory action of the agent is easily extended by the continuity of structure. The removal of the pulp by instrumentation may also produce traumatic injuries of the periapical tissues. At this phase of life not only is a condition of inflammation likely to follow pulp removal, but a debility of the parts that is difficult to treat, perhaps lasting for a long time and interfering with the development of the alveolar process around the root. Structural interferences of the apical region are more likely to be adherents of pulp-destruction and removal at this phase of life, and tubular calcification is arrested; the dentin becomes incapable of resisting the same crushing power of the vital tissue, the cleavage of enamel is impaired, the apical region may have the advantage of restoration to normal conditions that comes with the individual's ability to overcome interferences, the dead dentin may escape the encroachment of pathogenic organisms, and the tooth perform the function of a tooth; but it is exceptional for it to elude the necessity for frequent repair.

The flow of arterial and venous blood and the afferent and efferent transmission of nervous impulses through the apical aperture, when conducted physiologically, maintain the metabolism of the dentinal tissues. And should the pabulum furnished be sufficient to continue calcification of the dentin, the decreasing size of the pulp-chamber will be equal to the diminishing pulp and no irritation of the organ be produced. As the chamber becomes smaller, and with the corresponding decrease in the size of the pulp, we find the apical aperture diminishing. With the lessened aperture and smaller pulp we have an enlarged mass of dentin to be supported. With such conditions it may be pertinent to inquire if it be possible for sufficient blood-current to pass to support the dentin and pulp? It is at this phase of a tooth's life that we may expect fractures to easily occur. The peripheries of the dental tubuli are not nourishing the dentin that lies next to the enamel, and at no time is the condition so propitious for pulp-devitalization and canal-filling than the immediate past or present. The dentin has reached its density; the functional power of the pulp is beginning to wane; the apical foramen has undergone a modification of size, better protecting the tissue beyond from both medication and instrumentation. The relation between pulp and apical tissue has reached a condition when the relation of the pulp-chamber and canal with the apical region has made prognosis favorable for the necessary mechanical treatment of pulp-removal and canal filling.

Injuries to the apical tissue may result in interference to pulp

function,—from slight disturbance to complete destruction of the organ, as seen sometimes following the movement of teeth in orthodontia, biting thread, malocclusion, and blows. Pulp-disturbances following such accidental injuries may revert and play a very important part in pathological conditions of the apical region.

In pyorrhea alveolaris tubular calcification is augmented; the pulp and its dwelling-house are reduced in size. Whether this be the result of a diathesis or a local abnormality of function, the exalted circulation in the periapical tissue may be the excitation for the accompanying dentinal calcification. This is interjected as a query, with the thought that it is worthy of discussion.

Septic apical pericementitis being a morbid condition generally preceded and excited by putrefaction of the dental pulp, the bacteriopathology of this organ becomes a very important study not only to the practitioner of our specialty, but to the general surgeon, as the records furnish cases of necrosis and caries of the maxillary bones, affections of the antrum and nasal cavities, chronic pyemia, abscesses in different parts of the body, and fatal blood-poisoning from infection originating in a diseased pulp; and, many obscure cases not having been seen by one familiar with the pathology of the dental tissues, it may be presumed that the list could have been largely increased if one having a knowledge of dental pathology had been conferred with in seeking the cause of such affection. The state of the periapical tissue when inoculated with the infection from a putrid pulp becomes serious in proportion to the amount and malignancy of the infectious material conveyed to that point and to the physical tone of the patient. The surrounding structure of the point of infection is such that not only intense suffering is produced, but the course of pus seeking an outlet, if left to find one of its own making, is likely to be irregular and establish disease in other localities. These two facts make the relation of a pathological pulp to the apical region of consideration in the filling of all cavities, and the filling of teeth a preventive treatment for many disorders of the body, remote as well as in the immediately surrounding associate tissues of the teeth.

The mouth is an excellent medium, on account of the favorable temperature, the material for culture, and the moisture it contains, for the development of bacteria, both pathogenic and non-pathogenic. The pulp possesses the faculty of taking up the germs of infection in the mouth, and, though bacteriological investigations have not completed the work of cultivation and classification of germs found in inflamed and putrid pulp, sufficient work has been accomplished to show it has an attraction for the pathogenic variety, leaving the non-pathogenic to thrive upon the dead organic material of the mouth, the pulp thus acting as a sieve and medium for their entrance to the deeper tissues.

If a cavity of decay be sufficient in extent to encroach upon the pulp their entrance may be considered easy, as their association with the carious dentin and the accumulation of food in the cavity, with the irritation of the pulp brought about by the products of bacterial infection, make the cavity of decay and the pulp a con-

tinuous feeding-ground. When, however, the pulp is covered with dentin undecalcified as yet by the carious process, their entrance is more difficult. A question here arises as to what thickness of sound dentin is sufficient to protect the pulp from microbic ingress, or are there other ways by which they can accomplish it? Miller says, "The question whether an infection of the pulp may take place as long as it is covered by hard dentin must be answered in a positive sense. Out of fifty cases of diseased pulps I noted three in which the pulp was still covered by a layer of hard dentin, about one-eighth to one-quarter of a millimeter in thickness." There being cases of putrid pulps in teeth containing small cavities well filled and in teeth not affected with caries after receiving traumatic injuries, the transmission of infectious material must be sought for by other modes than through carious cavities. A suggestion has been made that they may work their way to the pulp through the cementum and dentin at the neck of a tooth. It is a doubtful manner for them to gain entrance, but it must not be considered settled until disposed of by microscopic examination and further knowledge of osmotic action in the cementum and dentin.

Another very possible way for them to find the pulp a favorable point is by the circulation. Bacteria enter the circulation by wounds and other means, and find in distant parts of the body centers of low vital resistance and there deposit themselves and produce inflammation, while at the point of introduction but little reaction will occur.

There is no reason to make the pulp an exception to this accidental infection when we recall the injuries the pulp can be exposed to. In cases where pulps have died after blows, biting of threads, and rapid moving of teeth, or under metallic filling, the predisposition being thus produced, the exciting cause may be explained by bacterial invasion through the circulation. In making microscopical section through the teeth in the very earliest stage of caries we find the pulp has commenced its work of defense, as in the pulp-cavity opposite the point where the caries have commenced a new formation of dentin is seen, showing the organ is ever on the alert to resist the disease. May not this effort on the part of the pulp for protection at times be sufficient to create a condition of low vital resistance? The contents of the dentinal tubules are ramifications from the pulp, and we must consider that practically when we are preparing cavities for filling, and during the operation of filling we are dealing with the pulp. In very sensitive dentin or in deep cavities where fillings are introduced without the precautionary measure of lining the cavity or placing an intermediary between the region of the cavity overlying the pulp and the filling-material, especially if it be of metal, speculation upon the chances of the pulp not becoming a center of infection is taken, as the effects upon it to overcome and protect from transmission of thermal changes, and the lack of consonance between filling-material and dentin, may so lower vital force as to create a focus of infection. The malleting of gold for the purpose of adaption to cavity walls has the same effect.

The profession is indebted to Drs. Black and Miller for the knowledge possessed concerning the pathogenesis of pulp bacteria, and, while many of the bacteria of diseased pulps have not been cultivated on artificial media and nothing definite is known of their pathogenesis, the experiments of these two investigators justify the hypothesis that under certain conditions the cocci and a few bacilli are very important germs in suppurative processes. The ordinary pyogenic bacteria, *Staphylococcus pyogenes albus* and *aureus*, and *Streptococcus pyogenes*, seem, from the results of these investigators, to predominate in inflamed and suppurating pulps, the former being the producers of the *materies morbi* in circumscribed inflammation, the latter assuming the same rôle in diffused inflammation. In circumscribed inflammation the lymphatics become blocked, and the infection is generally confined to a limited area. In inflammation of the diffused or phlegmonous character there is an extension beyond the affected location, the lymphatics taking up the infection. The effects of bacteria entering the blood are modified by the degree of resistance the patient possesses. If a person is in a fair systemic condition the blood coagulates readily, and thrombi form in the vessels. These thrombi may become infected by bacteria, and, becoming softened thereby, the infection will be conveyed farther along the circulation. Fatal cases of blood-poisoning are most generally due to a cachexia. Of course the condition is influenced by the extent of surface offered for absorption and by the surrounding structure. The character of structure surrounding an alveolar abscess, confining the pus-formation to a part, favors the development and virulence of the organisms, and it is not unusual to find constitutional disturbances, especially a rise of temperature, even in the case of circumscribed inflammation. Observation, however, has led to a belief that the diffused inflammations, especially when ushered in with great rapidity, produce a greater and more serious number of constitutional disturbances; and, whether this is due to the pyogenic streptococcus or to the particular bacilli described by Miller and that was so fatal to white mice, it is wise to note constitutional conditions when a case is presented and to early institute surgical procedures, both manipulative and therapeutic, recognizing that in diseased pulps from an early stage of inflammation to suppuration we are dealing with an infectious center; and while the propagation of bacteria, especially in the dental pulp, may be so great that they may perish in their own products, and in putrid pulp the organism may be absent throughout the whole of the putrid mass, but it is probably difficult to find a putrid pulp entirely free from bacteria. If such were the case a multitude of ptomains and spores would be present, suggesting the necessity for the free use of germicides in the pulp-chamber before any instrumentation is done. Again, a greater portion of the bulbous part of the pulp might be putrid with the remnant in the canal in good condition for bacteria to be propagating. In whatever condition we find the contents of the pulp-chamber, when it is desired to reach the apical region through this channel, whether it is a mass of putrid material throughout, varie-

gated in parts with putrid and decomposing material, or with pulp in a dry gangrenous condition, the indications for safety are for sterilization and antiseptic dressing. The familiarity with the infection of the periapical tissue is such that makes one almost stand in awe when thoughts of the possibilities and probabilities are indulged in. The weeks, and sometimes months, that are consumed before normal conditions are attained suggests the advisability of preventive measures being used to protect the pulp from both infection and any injury that might lower vital resistance during the operation of filling. Carbolic acid, being a coagulator of albumin, makes an excellent protector in small cavities. A very efficient and convenient way is to have sufficient crystals in a menstruum of alcohol to form a saturated solution. With its use the pulp receives a reasonable immunity from shock in small cavities. In larger and more sensitive cavities the demand is for a greater protector, and, in addition to the carbolic acid lining, something in the nature of a varnish should be used. Many preparations for this purpose are in the market, their composition and properties being unknown. The utility of aristol dissolved in chloroform for this purpose, to make no reference to any antiseptic value it may possess to make it valuable, can be readily recognized, as it possesses a resinous quality and a rapid facility for drying, thus becoming a mechanical protector.

It is, however, in the larger cavities, where the pulp may reasonably be expected to have had its vital forces drawn upon to such a degree that it may become a point of low resistance, that the dentist is most concerned as to what to use to permanently keep the balance. It is here, again, that commercialism has sought to render desired assistance. Of late years many preparations for use in large cavities with pulp complications have been put upon the market. If all claims for their efficacy were true the removal of pulps and filling of canals would be operations of the past. The burning of the midnight oil to understand structure and function, bacterio-pathology and therapeutics would be no longer necessary, as all this could be accomplished at a cost equivalent to the profit upon the preparation sold. The medical and dental professions are besieged to-day continually with preparations of this character to be used in the treatment of a variety of disorders. No doubt they have their therapeutic value and their use in certain cases,—as good as a personal description would be,—and by a carefully recorded empirical employment they could become standard remedies in many cases, but the profession or specialty that adopts their use puts a premium upon empiricism and hampers scientific investigation. When scientific investigation becomes unappreciated and the words of the vender take the place of the facts enunciated by the investigators, we will become weak in science, unprogressive, and, though continuing to develop as artisans, unworthy the name of a profession.

The antiseptic value of drugs used and suggested for the dental armamentarium have in a general way been thoroughly determined. In their original condition the practitioner can make a choice and manner of application to suit particular cases and individual ideas.

It is in the making of the mixture with a fluid and basis for the purpose of obtaining the desirable qualities of a stratum intermedium between filling and pulp region that definite knowledge is not superseded by that suggested by clinical experience. To illustrate and convey the thought intended, a few years ago it was suggested that hydronaphthol be mixed with the powder used with the phosphoric acid for making cement, thereby forming a cement having permanent antiseptic properties for pulp preservation. The suggestion was in the right direction, and probably would give the desired result, but it was void of the definite knowledge that might be gained by laboratory experiment. Hence the query, Have we any cement or manner of making one that can be used in treating dental caries with complication of the pulp that arises from bacterial infection? There seems to be a great demand for work in this direction, that we may have some definite knowledge for practical use and to offset proprietary preparations.

The value of oil of cloves, eugenol, carbolic acid, creasote, formaldehyd, aristol, hydronaphthol, etc., are well known, but their effects when mixed with a base, for the purpose of retention and the construction of a mechanical protector, is still surrounded by clinical information alone.

If bacteriological work analogous to that done by Miller to determine the antiseptic value of different filling-materials were undertaken to determine the value of intermediates, a great advance in pulp treatment would result. Until such work is undertaken and the results published we will have to depend upon the antiseptic properties possessed in the different drugs alone, and base our clinical treatment upon the observation of results. Zinc oxid has been the base used for the making of such protections, its properties being tonic, antispasmodic, and astringent; and when incorporated with an antiseptic fluid it seems to be about what is desired. My experience with eugenol as a menstruum has given very satisfactory results, and when we consider its antiseptic and anesthetic properties, when combined with zinc oxid, its value as an intermediary is apparent. It also has the unique value of being capable of being mixed to any desirable consistence, from one that is free flowing to one approximating the hardness of a cement filling, giving it the utility of an intermediary and a temporary or probationary filling. The addition of aristol, hydronaphthol, and iodoform can be made and the same degrees of density be obtained.

The respect for the apical region and its immunity from bacterial poisoning continues throughout the stages of exposure and destruction of the pulp. The conservative treatment of the pulp after exposure has received masterly attention from eminent students of dental pathology, so that no more than an allusion for purpose of discussion need be made.

The practice is imperative that a close supervision be had of such cases as require the treatment until the conservative results are attained, and is in demand in the early years of life when calcification is in progress.

The conditions and prognosis as formulated by the eminent

exponent of pulp-conservation, Dr. Louis Jack, and given in the "American System of Dentistry," I believe cannot be improved upon.

The destruction of the pulp, whether by the putrefactive process or therapeutic means, requires that the root-canals be placed and retained in a condition that will inhibit any ingress of infectious material. The tortuous and inaccessible canals make this difficult, and the ways and means of accomplishing permanent conditions within such canals perplexing. Where putrefaction has taken place throughout the entire structure of the pulp in teeth possessed with tortuous roots or in inaccessible localities of the mouth the best germicides and antiseptic treatment possible is about all that can be done, and canal filling must be used that can be removed if in the future morbid apical conditions should arise.

The difficulty and uncertainty attending canal work in many cases has proposed the advisability of mummifying the pulp-tissues in the canals after removal of the bulbous portion, thus making of the canal portion of the pulp a canal filling. The practice is still in the experimental stage, though it promises to be a favorable procedure when for any reason complete pulp-removal becomes impossible. The method, however, is suggestive of a quick and easy way of obtaining desirable results, and with the novice it may be followed by evil consequences. To the conservative practitioner thorough removal of all the pulp will be the ideal, and the mummifying method only resorted to as an expedient when complete removal is approximated. Thus will mummification find its legitimate place in practice.

The prevention of diseases of the pulp after prevention of dental caries is the most important study in prophylaxis that we, as conservators of health and comfort, have to pursue. Nélaton said that "the man who should discover the means of suppressing purulent infection deserved a statue of gold." Through antiseptic surgery purulent infection has disappeared from wound complications. Have we those remedies which are capable of preventing purulent infection of the pulp under our filling, and also of rendering all bacterial products contained in putrid pulps harmless to the human organism?

LA GRIPPE ODONTO-METASTASIS.

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(Read before the Baltimore County Medical Society, January 17, 1901.)

OF all the atypic diseases, la grippe is the most typic. Its exact pathology is not yet definitely settled, but sufficient has been learned to show that the Pfeiffer bacillus, in conjunction with atmospheric and climatic changes, plays the most important *rôle* in its etiology. It is supposed that the germ enters directly into the blood-current, as the whole nervous system becomes unbalanced from the begin-

ning of the attack, owing to impoverishment of the blood. Dr. Moreman says, "This anemia is not due so much to the death of the red blood-corpuscles as to the diminished production,—for a microscopic examination of the blood shows that the number to the cubic millimeter is less than normal,—but to the increase of leucocytes."

This zymotic hydra is of such a metastatic nature that when the general practitioner diagnoses a case he may have not only one evil to combat, but many complex conditions. Under his treatment it may develop into a simple influenza, or it may assume a more serious character, like pericarditis, endocarditis, nephritis, pneumonia, rheumatism, etc. Should the patient survive, often there are other more or less serious disturbances, as sequelæ. In this paper your attention is called to some dental complications caused by this malady.

The following four cases are cited to show some of their characteristics:

Case I.—Mrs. S., aged twenty, of nervo-bilio-sanguineous temperament, complained of a deep-seated pain in the left side of her head and face, which seemed to spring from an upper left bicuspid tooth, the distress at times being so great as to preclude sleep. The trouble had begun two weeks previously, while being treated by her physician for la grippe. He prescribed all the usual remedies, but failed to give relief. On examination the tooth supposed to be the cause was found to be in a normal condition; was not sensitive to touch, heat, cold, or percussion, nor did the epithelium of the gum-tissues indicate any pathologic changes.

In the tooth was a small filling, which in no manner could have caused the pain. The tissues on both sides of the tooth were painted with the tinctures aconite and iodine, and, as an analgesic, was given acetanilid, caffeine, and soda. The next day she said the pain was so intense that the tooth must be extracted or she would go mad. Her request was refused, and believing that the trouble might be induced by deposit of calcium salts in the pulp, it was devitalized, removed, and the dental canal filled. A few days later she said that some relief had been given, but occasionally a pain would shoot out, seemingly from the apex of the tooth. Later on she said that the corresponding tooth on the opposite side of the jaw had been giving her similar pain to the one treated. Tic-douloureux pains continued more or less until she had fully recovered from la grippe.

Case II.—Mrs. M., aged forty-one, of nervo-bilio-sanguineous temperament, was under treatment by her physician for la grippe when she was seized with an agonizing pain simulating neuralgia in two upper bicuspid teeth; the pain increased as night came on. This condition continued for days. Neurotic remedies having failed to give relief, the doctor had to prescribe hypnotics to give her any rest. The pain continued with more or less intermission until she was able to leave the house, when she visited a dental practitioner in her neighborhood.

On examination he could find nothing to cause the trouble, but

the irritation was so persistent that he concluded to devitalize both the pulps, which he afterward removed and then filled the canals. So little relief was given by the operation that she called on us for advice.

The case was diagnosed as a reflex of la grippe. Painted the gum-tissues with the tinctures aconite and iodine, and referred her back to her medical adviser. A few days later she returned and said the corresponding teeth on the opposite side had been giving her more or less pain, but the distress was not great enough to cause any loss of sleep. When patient had fully recovered from la grippe all pains and unpleasant sensations ceased.

Case III.—Mrs. H., aged forty-five, of nervo-bilio-sanguineous temperament, complained of uneasy and undefined painful sensations along the line of the upper jaw, occasionally increasing at night-time and causing her to awake from a sound sleep. At times it appeared to be superficial, and at others to radiate from an upper bicuspid tooth. On examination all the teeth were found in a normal condition. The tooth was tested with heat, cold, and percussion, with negative results. As patient was suffering at the time with what seemed to be coryza, the case was diagnosed as one of reflex neurosis, caused by the inflamed condition of the upper air-passages. Calomel, quinin, and codein were prescribed, and local treatment given with the tinctures aconite and iodine, which gave some temporary relief. In a few days she developed a case of la grippe, which terminated in abscess of the left tonsil. Two weeks later she had a relapse, and came near having an abscess of the right tonsil; during the interval a bicuspid tooth on the same side gave symptoms similar to those of the bicuspid on the left. After recovery all pains of a dental nature ceased.

Case IV.—Mrs. N., aged thirty-one, of nervo-bilio-sanguineous temperament, was suddenly gripped, without any premonition, with acute pain in the lower left bicuspid tooth; she said she had felt as though the tooth would jump out of the top of her head. On examination all the tissues of the mouth were found in a normal condition. The tooth complained of was normal in every respect; not a sign of any dental caries, nor had it ever been filled. The case was diagnosed as one of reflex neurosis, due to uterine troubles, for which the patient was being treated by a specialist. Gave constitutional treatment of quinin, calomel, and strychnin; local treatment given with tinctures aconite and iodine. The next day pain was so intense that the patient pleaded to have the tooth extracted; this was refused, but painted the tissues around the tooth with crystal carbolic acid; this gave great relief, and patient was dismissed. The next day she said that the tooth was all right, but all the pain had centered in the nape of her neck. A few days later she developed a case of la grippe, which culminated in serious dual pneumonia.

We have read a great deal in medical and dental literature, hoping to find an account of some similar case to those mentioned, but the field was barren. The nearest approach to them was found in an article published in the *DENTAL COSMOS*, August, 1900, by Dr.

W. W. Coon, entitled "Edema of the Antrum of Highmore as a Complication of La Grippe." Speaking of a tooth complained of by one of his patients, he says, "The symptoms were apparent of a commencing alveolar abscess, but I soon found enough of the pulp to prove that the tooth was enjoying good health. No more was done than to relieve the pain constitutionally and observe results. Thus will these cases run their usual course, and I believe many times unrecognized as to the true nature of the cause, being considered neuralgic pain that is necessarily a part of influenza or its sequel."

Had Dr. Coon's attention been called to that particular tooth later he would have found its pulp dead, notwithstanding it was living when he examined it, because, with our experience with similar cases, after recovery from la grippe the pulps in all teeth so affected were found to have died. It was so in cases III and IV, and the same conditions would have developed in cases I and II if the dental pulps had not been surgically removed.

One of the most peculiar features of this lesion is that while the symptoms indicate threatened alveolar abscess, or dying or suppurating pulp, all the usual clinical features are absent, showing that the dyscrasia was of a truly neurotic nature. There are many other interesting points which could be mentioned, but time is too limited to speak of them now.

The question before us is, What were the agents which produced the conditions, and how did they operate? So far no special toxin of the micro-organism of la grippe has been discovered, but it is well known that one of its chief characteristics is a lessening of the number of red blood-corpuscles, thereby inducing a sub-alkalinity of the blood and a consequent greater or less degree of defective metabolic equilibrium. Especially is this trait demonstrated at points of lowered or weakened vitality, or where the germs focus and multiply. This being the case, we presume that the origin of the pain before and after extirpation of the dental pulps was due chiefly to the irritation of the nerve centers and filaments by the poisonous effect of uric acid, deposited by the blood-plasma at or near the apices of the teeth. The devitalization of the dental pulps was caused by an endarteritis, followed by an abnormal multiplication of endothelial cells, which occluded the bloodvessels supplying the pulps. In other words, the pain was produced by the continuous low inflammation of the involved nerve-tissues, and the necrosis of the dental pulps was the effect of shutting off the nutrient supplies.

Dr. Moreman says, "Neuralgia and la grippe seem to be synonymous terms, hemicrania, tic-douloureux, and facial neuralgia in any form being an inflammation of the nerves; naturally a tooth-bulb or pulp supplied by a nerve ravaged by inflammation would die."

Of late we have been treating similar cases with anti-lithic remedies with much success, which fact has convinced us more than ever that our hypothesis is to some extent correct.

Dr. Lemmer says, "Many diseases and a multitude of symptoms

of heretofore unknown pathology and speculative causation are now recognized as occurring only under the condition of excessive uric acidity, and the major harm from uric acid seems to rest on its peculiar power of disturbing the peripheral arterial supply."

AN APPLIANCE FOR DOUBLE FRACTURE OF THE SUPERIOR MAXILLAE, ALSO ONE FOR DOUBLE FRACTURE OF THE INFERIOR MAXILLA IN A CASE OF DOUBLE FRACTURE OF BOTH MAXILLAE.

BY J. BOUVET, CHIRURGIEN-DENTISTE DE L'HOTEL-DIEU, ANGERS.

(Read at the Third International Dental Congress, Paris, August 8, 1900.)

It is not our purpose to describe all the appliances devised for the treatment of fractures of the superior maxilla. The diversity of these fractures implies a great variety of appliances. Only three call for particular attention,—that of DeGraefe, that of Goffres, and that of Prestat.

When separation and pronounced displacement of the maxillæ exist, DeGraefe advises the use of an appliance formed by a frontal band of steel lined with leather and maintained in the desired position by means of a leather strap; at each side of this steel head-band there is a socket through which a bar is slipped; this bar is adjusted to the right height by means of a screw. These bars have curved ends and terminate in a silver piece made to inclose the upper teeth.

Goffres's appliance for comminuted fracture is formed by a head-piece maintained in position by means of a strap which is adjusted under the chin. In front the frontal framework has a ball with two screws which support two vertical bars that are curved so as not to interfere with the nose. These bars terminate in the mouth. At their extremities they have caps which are adjusted to the teeth by means of gutta-percha. A lateral band fixed to one of the vertical bars presses against one side of the maxilla.

To hold the palate, which is separated from the rest of the maxilla, Prestat used two silver bands, two centimeters wide and fifteen long. These bands were shaped like the letter S. In this way two grooves were formed, one for the lips and the other for the teeth; each of these bands was placed near the commissure of the lips over the canine and first bicuspid. That part of the band inclosing the teeth was pressed together at a point near the roots. Lastly, an appropriate inclination was given to the appliance, which was fixed to the head-piece by means of ribbons. We must attribute to this appliance many imperfections; first, the coaptation of the fragments is but imperfect, while the correction of a faulty reduction is impossible or nearly so; again, the feeding of the patient becomes very difficult on account of the articulation being interfered with by the presence of the silver bars. We have tried to avoid these three defects in the construction of our appliance.

CASE I. *Double Fracture of the Superior Maxillæ.*—Following

is the description of a case in the practice of Dr. Mullois, former chief of clinic of the Hôtel-Dieu of Angers:

On the 5th of April, 1897, Mons. F., a farmer of the suburbs of Angers, while cutting from a poplar tree a branch that had a diameter of fifty centimeters, suffered a serious accident, his face having been squeezed between this branch and another, the two branches forming a figure shaped like the letter Y. I arrived at the scene half an hour after the occurrence and could see the traces of an abundant hemorrhage. He did not lose consciousness, and was able to walk thirty feet after the accident took place. On the face only a few scratches and some ecchymosis could be seen; speech was interfered with; the nose and the throat were filled with blood that remained from the excessive hemorrhage. With the exception of a fractured tooth the inferior maxilla was intact, but a thing that called my attention was the ease with which the superior maxillæ could be moved about in every direction. They were not separated on the median line, but it appeared as though they were separated from the rest of the face above and behind, forming a separate block that could be oscillated like the clapper of a bell. These bones were held in the mouth by the soft tissues which had not been lacerated. After a careful examination I discovered that on the left side the nasal bone and part of the inferior border of the orbit were completely fractured. The malar bone was pushed in and fractured into several pieces; the malar process was also fractured on the left side of the face, the cheek was flattened, and the eye projected slightly. On the right side, with the exception of the fractured nasal bone, it was impossible to detect any crepitation.

The abnormal mobility could be explained by the line of fracture, which was horizontal, passing below the malar bone and dividing the maxillary sinus. The two palatè bones and the two pterygoid processes were fractured.

When pressure was exercised against the pterygoid processes they moved and the patient felt an acute pain. The septum of the nose was also fractured. The superior maxillæ were not only movable, but when left to themselves these bones took a vicious position. In fact, the alveolar border was lowered and lay behind the alveolar border of the inferior maxilla. Normally the upper front teeth of this patient bit upon the lower; the existing abrasion of the upper teeth was sufficient proof that this condition existed before the accident took place. When the fragment was put back to its former position the patient could not close the mouth, and a space large enough to permit the entrance of a finger could be seen between the upper and lower incisors.

In order to maintain the fractured bones I sought the aid of Dr. Bouvet, dentist to the Hôtel-Dieu, who had on several occasions successfully placed prosthetic appliances for the reduction of fractures of the maxillæ. I told him that I feared the danger of the appliance interfering with the frequent use of antiseptic solutions and with the nourishment of the patient. Dr. Bouvet then devised the appliance a description of which here follows:

The principal points of the appliance are: A metallic plate which incloses tightly the palate and the alveolar border. It is connected with the head-piece by a system of articulating bars which enable the appliance, and hence the maxillæ, to be placed and maintained in an immovable position.

We will describe successively the different pieces of the appliance,—the head-piece, the plate, and the system of articulating bars.

FIG. 1.

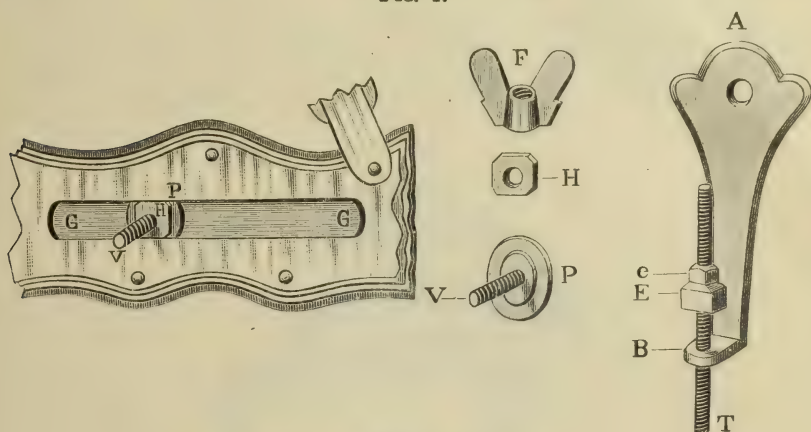
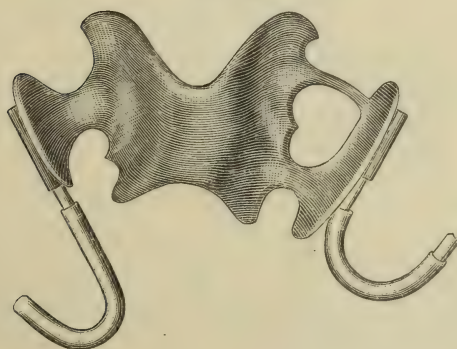


FIG. 2.



The *head-piece* is formed by three steel bands lined with leather. The horizontal band (the fronto-occipital) can be adjusted by means of a leather strap. The sagittal band is incomplete, as in the protective masks used in fencing, being supported by pressing against the occiput. The third, the transverse band, unites the other two.

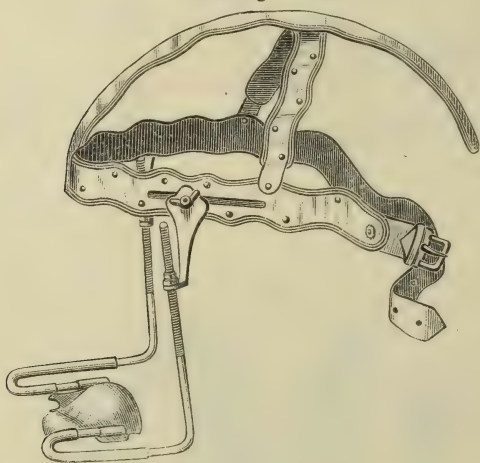
The horizontal band presents upon each lateral aspect a slot G G, Fig. 1, eight centimeters in length by one in width. In this slot (as shown) works a small disk (shown also at P) from which projects a vertical screw. On this screw are placed an intermediate plate or washer H, the plate A, and the nut F.

The *palatal piece*, Fig. 2, is the fundamental one, and is made of platinum in order to get a plate of slight thickness combined with

great strength. This plate is made from a model of the palate and the dental arch. The dental interspaces and spaces due to the absence of teeth have been made use of to unite the palatal portion of the apparatus to the pieces which cover the external alveolar walls.

The system of articulation comprises a solid metal plate A, Fig. 1, of a triangular form; it has a hole pierced in the upper part for the passage of the screw V. This plate has its lower extremity turned at right angles to form a flange or return end, in which is pierced a central hole B, through which the rod T passes, this rod being threaded for the purpose of receiving the two nuts E and e; the smaller nut e being placed above the larger one E. The rod T is turned at right angles (as shown in Fig. 3),

FIG. 3.



the vertical arm being ten centimeters and the horizontal nine centimeters. The horizontal arm is curved and is soldered to the platinum plate (as shown in Fig. 2).

The head-piece is first put on, and the leather strap is then tightened. Next the platinum plate is placed in the mouth and the two rods T are passed through the holes B. After this part of the operation has been performed, the screw V is introduced into the intermediate plate or washer H and then through the one in the plate A. The nut F is then screwed to the piece V, but is not tightened. The plate A communicates the movement of the disk P, and can be moved from one end to the other of the slot G G. Besides this, the piece oscillates around the piece V, which acts as the axis in such a way that it can be made to take any position and then be tightened by means of the nut F. The plate A is placed in the position which seems to be the most desirable, and the nut E is screwed to the rod T. The plate can be moved until it is in the right place; the jam nut, e, is then tightened.

The advantage of this system is that the surgeon can place the maxillæ in the position he desires. He can give them a forward

or backward direction by moving the disk P in the slot G G, or by acting on the screws by means of the nuts E e. With this appliance the patient has the advantage of having the free use of the lower jaw; he can execute the movements of mastication and can feed himself conveniently.

This appliance was placed in the mouth six days after the accident took place. During the first few days the patient ate only liquid food, soups, etc. From the fifth day he began to eat bread, and after the eighth day he could masticate meat without any difficulty.

After fifteen days the appliance was removed, consolidation having been nearly completed. As a matter of precaution the patient was made to wear the appliance for fifteen days more, as it did not annoy him in the least.

FIG. 4.



The result was beyond our expectation; not only in that the patient did not have any fever, but the facility afforded for the frequent washes with boric acid solution, the easy nourishment of the patient, and the perfect consolidation of the fracture, made it possible to remove the appliance, and to-day Mons. F. is only slightly annoyed when opening or closing the mouth; this movement, however, becomes easier and more extensive every day.

Before concluding our work we must make the following remark: In constructing this appliance we have followed the idea of the appliance for fractures of the inferior maxilla devised by Dr. Martin and modified by Dr. Martinier. In this appliance the fulcrum is in the chin. The metallic cap inclosing the lower teeth is united to the chin-piece by means of a median spring, or by means of two lateral arms which are fixed on the sides by means of screws; this arrangement permits the reduction, and if necessary the displacement can also be corrected.

An analogous idea has directed us in our work. We have

used the occipito-frontal region as a fulcrum and we have united the head-piece to the supporting plate by means of the system of bars, slot, etc.

CASE II. *Double Fracture of the Superior and Inferior Maxilla.*—The following case occurred in our own practice:

Dr. C. on the 25th of April sustained a traumatic injury under the following circumstances: The horse harnessed to his carriage ran away. He ran in pursuit, and coming abreast of the horse, on the left side of the animal, he extended his hands to catch the reins; but at the same moment he fell, and one of the wheels passed over his head and chest. The patient was not able to state what was the exact position of his head with relation to the wheel and the ground. He stated merely that the left side had suffered more than the right. He did not lose consciousness, and was able to get up and sit down. At the time of the accident he did not feel any pain. He knew, however, that something was fractured, but he was not able to determine as to which bones. Nevertheless he discovered that the inferior maxilla was fractured in two places, and he also felt a marked crepitation in the region of the nasal bones. Hemorrhage through the nose and mouth was very profuse, and was the cause of syncope and of dizziness on two different occasions. The skin was not very much lacerated. Only a few wounds at the left side of the face were present. In the region of the thorax the patient suffered a severe contusion. The effects on the face were the most serious.

That same evening the patient was taken to the hospital and was put under the care of Dr. Monprofit, professor of clinical surgery. He put the patient under our care, and it is due to this fact that we are able to-day to publish this observation.

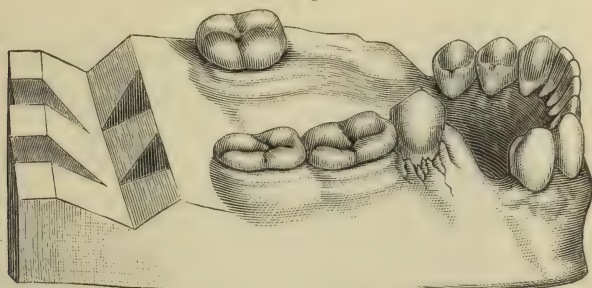
During the first few moments after the accident the patient could speak, but very briefly. Swelling appeared and then the patient could not say a word. From that moment he had to write everything he wished to say.

The loss of blood, which had been considerable, the vibration of the carriage and of the train, and the sensation of intolerable thirst had fatigued him so much that when he arrived at the hospital he was almost exhausted. His condition had been rendered more painful by the impossibility of lying down and even of sitting in the normal position. When he wanted to lie down he felt as though he was getting smothered, and he also felt a tickling sensation in the posterior wall of the pharynx, which produced a desire to vomit. These phenomena ceased when he leaned forward, or when the superior maxilla could be pushed forward by introducing one finger into the mouth. At this time his greatest suffering was due to the intense thirst. Under the circumstances it was impossible to give him anything to drink. We tried to give him drink by means of the glass and the spoon, and also by injecting lemonade into the pharynx; but as the movements of deglutition were impossible the patient rejected the liquid, experiencing at the same time severe pain.

The patient was examined by Drs. Monprofit, Boquel, Milsonneau, Bernard, Canonne, and by us. The examination was a very difficult one on account of the position of the patient, and in order to explore the mouth recourse was had to the electric mouth-lamp.

The first thing discovered was a double fracture of the lower jaw. The lines of fracture were between the two bicuspsids on the right side and back of the second bicuspid on the left. The root of the second right bicuspid was exposed and the soft parts were lacerated at this point, and there was a space of one centimeter between the two bicuspsids. The absence of the soft tissues exposed the line of fracture and gave us a view of the perfect regularity of the fragment, which seemed to have been separated by means of a saw. On the left side the separation was of less width and the soft tissues were intact. The median portion

FIG. 5.



Cast of the lower jaw, showing the displacement.

separated from the rest of the bone had undergone a forward movement; this fragment was pressed downward by the suprahyoid muscles, while the fragments were carried upward by the elevator muscles of the inferior maxilla. An examination of the face revealed the following lesions: At the level of the nasal bones toward the median line and at either side a marked crepitation could be heard. Slight pressure under the lower orbital border and above the dental arch was the cause of violent pain in a horizontal direction.

The examination further revealed that the superior alveolar border had undergone a downward and backward movement of such a pronounced nature that the upper canines were on the same transverse line as the lower first molars. The double and inverse movement of leverage of the upper and lower fragments was such that the space between the upper and lower incisors was from two to three centimeters.

It was impossible to make a more complete examination. The little finger could not be introduced into the mouth in order to examine the pterygoid processes, but if the alveolar border was taken between two fingers at the level of the canine teeth it could be moved as though it were the clapper of a bell.

To recapitulate, we will say that the patient presented a double

transverse fracture of both maxillæ without separation at the median line. We will also remark that very seldom are such extensive displacement and mobility observed. Surgical literature furnishes us with but a very limited number of similar cases.

The patient felt as if on the left side the upper fragment had a tendency to move downward and inward, this sensation being probably due to the absence of teeth in the inferior maxilla at the corresponding point.

It can be seen now that as the osseous mass was only maintained in a very loose way by the soft tissues, it had the tendency to go backward until it reached the posterior wall of the pharynx; this explains the suffocating feeling experienced by the patient, and the necessity of his maintaining a posture with his body leaning forward in order to avoid severe nausea.

The swelling appeared at first rather slowly, but from the first night it reached such proportions that the patient became altogether deformed. The swelling of the head and neck was accompanied by ecchymosis, very marked in the lower eyelids, especially on the left side. At this time the condition of the patient was believed to be a very serious one; the physicians feared inflammatory complications in the respiratory tract; this condition, however, changed very rapidly.

During a few days the patient could not lie down and had to remain in an arm-chair, his head resting on a table placed before him; the blood and mucus could in this way be ejected from the mouth with greater facility. For a long time the patient complained of an abundant salivation, which made him very tired. At no time did the temperature rise above the normal.

The general treatment consisted of frequent washes of boric acid solution, repeated every quarter of an hour, of injections of artificial serum, and of nutritious enemata during all the time that the patient could not swallow. Later on he succeeded in taking some liquid food; he could only get it down by supporting the fragments and inclining the head forward. Deglutition was very painful.

On the 26th, the day after the accident, we took the impression of the superior maxillæ. This operation was probably the most difficult step in the construction of our appliance, because of the uncomfortable position that we had to take, and of the pain and resistance of the patient against our efforts. Besides this, the posterior fragments of the inferior maxilla followed the movements of the superior maxillæ and interfered with the introduction of the impression tray. After continued efforts we succeeded, thanks to the assistance of Dr. Canonne, who raised and maintained in position by means of suitable pliers the fragments of the superior maxillæ.

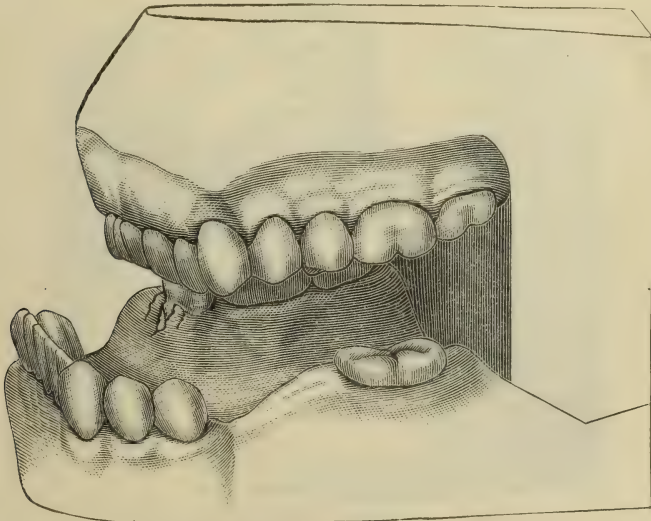
On the 29th an appliance for the coaptation of the maxillæ was placed. This appliance was absolutely identical with the one that we have already described. (See Case I.) We will remark that in this case all the teeth were present in the superior maxillæ; we united the palatal piece to the pieces covering the external

alveolar walls by means of platinum wire adjusted between the teeth at the level of the masticating surface.

For two hours after the placing of the appliance the patient experienced very severe pains, which obliged us to loosen slightly the screws which acted upon the plates. In the afternoon he was able to lie down on a lounge, and on the night of the 29th he was able to rest in bed for two hours.

On the 1st of May we took the impression of the lower jaw, but in order to do so we had to remove the upper appliance because its lateral arms interfered with the operation. As soon as we removed the appliance the patient, who was in the ordinary position, suffered violent pain; he carried his hands to his head

FIG. 6.



Articulation at the moment of the accident.

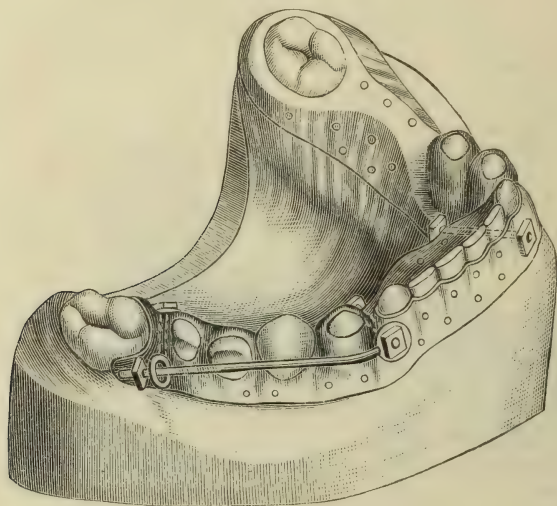
and had to incline his head forward in order to stop his suffering; when the maxilla was back to its normal position the patient ceased to complain. We then took an impression of the inferior maxilla. This operation was performed with great difficulty. The upper appliance was then put back in its position, the pain ceased, and the patient was able to take the vertical position.

On the 3d of May the appliance that was constructed on this model was placed in the mouth. This appliance consisted of a metallic piece covering the teeth as advised by Dr. Martin, of Lyons. This piece was kept in position by means of metallic bars passed between the first bicuspid and the canine on the right side, and between the lateral incisor and the canine on the left side.

The result obtained seemed to us to be insufficient. This was due to several causes. First, the impression of the jaw was a defective one, a thing which is not surprising when we consider the difficulties under which we had to work. The molar teeth were

very short and the appliance lacked in posterior support. The result was that the anterior fragment went forward and carried with it the appliance, which was raised posteriorly and hence was of no use. We then made a metallic piece to go between the first and second right molars. This bar was fixed on the inside of the mouth by means of a nut, and terminated on the buccal side by a ring. A rod three centimeters in length was fixed in front at the level of the interstice between the canine and first bicuspid, and passed through the ring in the posterior part of the appliance. This rod was threaded at its posterior extremity so that a nut could be screwed on. The placing of the piece between the molars and the adjusting of the nut were very difficult operations.

FIG. 7.



Appliance in position.

From this time a great improvement was noticeable. The patient could hold his head either in the erect or in an inclined position, and could take more substantial food. He was able to go out a few days after.

The appliance was removed on the 22d day and consolidation was complete. The second appliance was removed fifty days after it had been placed. During two months the patient felt a peculiar sensation at the level of the teeth. This phenomenon has now disappeared. Consolidation is perfect, and mastication is carried on in a normal way. Deglutition has never been interfered with since the appliance was put in place.

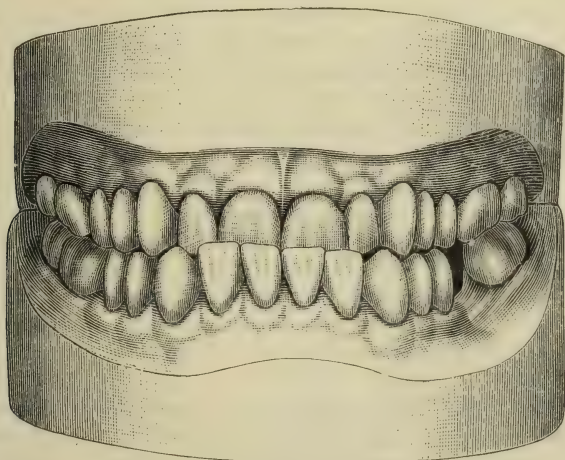
The only change that has taken place is that to-day the lower teeth cover slightly the upper teeth. When the appliance was removed the upper incisors bit on the edge of the lower ones. It may be that the appliance was removed too soon, but we did it at the instance of Dr. C. (the patient), who became impatient and was threatening to remove the appliance if we did not do it.

Conclusions.—Our appliance for double fracture of the superior maxillæ presents several improvements, as follows:

1. By substituting for the cap a plate made to fit the palate we get a stronger support. It does not interfere with the articulation; it does away with the use of the chin-piece, and this is a great advantage for the patient, as it allows him to eat solid food as soon as the appliance is in position.

2. With the system of articulated bars, with screws, nuts, etc., the palatal plate can be moved around a horizontal axis and the osseous fragments can be put in an exact position, and even defective reduction can be corrected. The hold is perfect, and no displacement need be feared after coaptation is once secured.

FIG. 8.



Articulation after reduction.

In our second appliance the portion which seems to us to be new and practical is the one that we have devised in order to remedy the insufficiency of the cap. We are convinced that in the case now reported the cap would have been of no use for the bringing together and the firm holding of the fragments on the right side. This double result was only obtained in a perfect way by the use of the little appliance that we have described. In the future when treating similar cases we shall not make use of the cap; we shall only apply the bands. In this way we can secure union even when considerable space separates the fragments.

The advantages derived from the use of the set of appliances described are as follows:

The doing away with the necessity for taking an impression,—a procedure which is always painful to the patient.

The saving of time in the construction of the apparatus, and also in placing it.

The facility with which the irrigations of the mouth can be carried on.

"ALLOYS," OLD AND NEW.

BY HERBERT L. WHEELER, D.D.S., WORCESTER, MASS.

(Read before the Massachusetts Dental Society, June 5, 1900.)

THE first that is known of amalgam for the purpose of filling carious teeth was when M. Taveau, of Paris, advocated the use of what he called silver paste for permanent fillings in 1826. Four or five years later two Frenchmen by the name of Crawcour began to advertise the stuff in America, under the name of the Royal Mineral Succedaneum, meaning by this, I suppose, a mineral substitute, which of itself should have stamped them as fraudulent adventurers. The ease with which the material was manipulated soon brought it into use, especially with the indolent members of the profession, also those who lacked manual dexterity, and a large class which are still with us,—those who hope to succeed financially by offering the public some novelty as a bid for practice, rather than conservative, conscientious work. In proportion as this material was taken up by the slovenly and those with marked incapacity, it was denounced by the reputable and able practitioner.

Gradually some of the more able men of the profession began to carefully experiment with the new plastic, until finally, about 1855, Dr. Elisha Townsend, of Philadelphia, gave the first formula for an alloy that was based on any foundation other than empiricism and quackery. This was: Silver 4 parts, tin 5 parts.

Gradually the fierce discussion that the use of this material had fomented resulted in honest investigation as to its true merits and demerits, and culminated somewhere about 1877 in the formation of what was known as the "New Departure Corps," of which Dr. J. Foster Flagg was the moving spirit. And the work commenced and carried on by this organization has done more to place alloy-making and the use of amalgams upon a scientific basis than any other force that has been brought to bear upon the subject, and for years, until the work of Dr. Black, the results arrived at by them have stood as authority, and it is doubtful if a majority of their conclusions do not still stand.

In one point the makers of alloys and users of amalgams of earlier days differed from those of the present. The fundamental idea of the "New Departure Corps" was that amalgam was more compatible with tooth-structure than gold. Especially Dr. Palmer and Dr. Flagg advocated this theory, and by some mysterious and miraculous relationship of silver or copper, or both, to tooth-structure the earlier amalgam compounds were supposed to save teeth, especially the frail, chalky, or soft structures,—or rather what was considered soft and chalky at that time. Many now think, from Dr. Black's experiments, that there is very little variation from a single standard of hardness in the structure of any teeth from the human mouth. However, we must acknowledge that if the compatibility theory was wrong its exponents produced alloys that made amalgams that saved teeth, and saved those that were considered hopeless by the gold worker.

Silver, tin, and copper were considered the metals *par excellence*

that were compatible with the tooth-tissues, and gold, zinc, and the less often used metals were used simply as modifiers to control either bulging or color, or both. In one thing they utterly failed; that was to produce an amalgam that would keep its original form and color in the cavity, and it is to these last qualities that our later-day experimenters have fastened their attention.

The older school of amalgam makers certainly succeeded in producing alloys that would save teeth for years, though they did discolor and crevice badly.

Dr. E. C. Kirk says of alloys, in an article published in the *International Dental Journal* for April, 1895, before Dr. Black's experiments were published, "There are now to be found and are everywhere obtainable alloys that fulfill their function as savers of teeth, under certain conditions, in a manner unapproached by any other material." And in the "American Text-Book of Operative Dentistry," edited by Dr. Kirk, is an article on Plastic Filling-Materials by the late Dr. H. H. Burchard, in which he says, "The formula given by J. Foster Flagg as affording the most stable alloy for amalgam—60 silver, 35 tin, 5 copper—was found by Dr. Black to be that giving the highest degree of resistance to change of form, to flow, and to crushing."

This shows that whatever may be said of the theory of compatibility, the old amalgams, like Lawrence's,—which was: Silver, 47½, tin 47½, copper 5,—and the Submarine of Flagg's, the formula of which is given above, and Flagg's Contour,—Silver 64, tin 33, gold 3,—and Arrington's, which was similar to Lawrence's, did save teeth, and saved them for years, though they all discolored or creviced badly.

The physical properties of dental amalgams were not understood until the exhaustive researches of Dr. Black, of Jacksonville, Ill., were published in the *DENTAL COSMOS* in 1895 and later. These experiments have certainly changed the whole field of alloy manufacturing, and given an impetus to the sentiment that would attain in an amalgam a material similar in its properties to gold; that is, a plug for carious teeth that will not change form or color. All of the amalgams before used have either shrunk or expanded and discolored. Dr. Black's work has resulted in a storm of alloys warranted not to shrink, and to expand perhaps one-ten-thousandth of an inch, to hold color, and to stand the stress of mastication and not flow. Whether they will come up to this standard only time and great skill and accuracy in mixing will decide, and this is modified by the care with which the alloy has been made and annealed. Dr. Black has shown conclusively that the formula is not as important in making an alloy to fulfill certain requirements as the proper annealing at the right temperature, and that, after all this is done in the most accurate manner, the mixing may change or seriously modify the whole result. Nevertheless, it seems to the writer that no sure, practical data from the busy practitioner can be secured until the formulas of alloys on the market are given to the profession, or, if not given, demanded.

The dealers feel that it is hardly fair to them to give the formula;

but analysis is possible, and the numerous modern alloys follow pretty nearly the same formula, being four-metal alloys, except The S. S. White Dental Mfg. Co.'s new Dentalloy, which I am informed is a two-metal alloy. As far as I know, "Fellowship" alloy is one of the oldest of the alloys based on Professor Black's researches, and its formula, according to Booth, Garrett, and Blair, of Philadelphia, is: Silver 67.73, tin 26.33, copper 4.71, zinc 1.23, and the Twentieth Century alloy is very similar, evidently a copy; its formula, as analyzed by the same parties, is: Silver 60.81, tin 27.32, copper 4.39, zinc 1.51. "Rego" and "Triumph" alloys are practically the same. If there is any great difference in these alloys, it must be caused by the difference in annealing.

Making a few tests with ten or more amalgams from old and new formulas, in glass tubes, I find that all the modern alloys expand, yet this does not seem to stop leakage when red ink is applied, though the new Dentalloy of The S. S. White Dental Mfg. Co.,—which is probably: Silver 72.5, tin 27.5,—properly annealed, showed less tendency to leak than any of the lot. It is a question, though, if the value of tests in glass tubes is not open to decided objection as an accurate scientific test. The real question as to the value of modern amalgams as savers of teeth must be decided by time and clinical practice.

The only difference I can see between the advocates of amalgam a few years back and the present day is this: Then amalgams were supposed, in some unexplainable way, to have therapeutic value when placed in so-called soft teeth; to-day the desire is for a perfect mechanical plug that will not change shape or color, a filling whose action is similar to gold. It is too early yet to decide which of these ideas has produced the best material for saving teeth. The writer uses both, and is trying in actual practice to solve the problem by comparison of results.

APPROXIMAL FILLINGS IN THE UPPER ANTERIOR TEETH.

BY DR. E. S. HATHAWAY, MIDDLEBORO, MASS.

(Read before the Massachusetts Dental Society, June 5, 1900.)

MR. PRESIDENT AND GENTLEMEN: I owe you an apology at the outset for attempting to write anything upon this well-worn and practically exhausted subject, and also for the elementary manner in which I present it, realizing that its details are well understood by all before me.

This paper is more a plea for a special method than an attempt to add to the stock of knowledge. I shall leave out of consideration those cavities so large as to oblige the operator to fill them as he can, and consider only those whose size is not too great to allow the dentist a choice of methods.

The best method is that which gives to the tooth the longest period of usefulness, and if to this can be added the avoidance of disfigurement and the minimum of pain for the patient, with ease

and comfort to the operator, the method approaches the ideal. That this is possible I hope to be able to show.

There are three methods of preparing these cavities for the reception of the filling, the longest in use being that which preserves the simple circular or oval form of the cavity; access being gained by a process—more or less rapid—of wedging, and with but little sacrifice of tooth-substance.

This method succeeds well in the avoidance of disfigurement, and is not difficult for the operator. It has a certain use in temporary work, and in some cases has resulted well in respect to permanent fillings. It fails to fulfill all requirements for the reason that the necessary separation makes it an unnecessarily painful process, and the conditions of contact which have resulted in decay are present to produce it again and again. Separation also is not without dangers of its own; the loosened teeth sometimes fail to close up or even move to new positions. Such a case occurring in my early practice perhaps prejudiced me against separation by any form of wedging, which I have found myself able to do without for many years.

A popular method of treating these cavities is by direct approach from the front. This has one, and, to my mind, only one, merit,—the cavity is made easily accessible; but, unless the patient is made to bear the pain of separation, the result is likely to be the disfigurement resulting from a needless display of gold, and it becomes a serious question how far the dentist has the right to oblige his patient to display his handicraft. His art, if he had it, would conceal its processes and leave his patient's expression natural.

Fillings made in this way, while somewhat more durable than those of the first sort, still fail readily. The cause is not far to seek; the palatal enamel, which is in all respects less fitted for resistance, has been saved at the expense of the labial, and, with its concaved surface, often thin, grooved, and even fissured, is used to support the filling, while the thicker and sounder enamel of the labial surface has been wasted in the effort to get a direct approach, and the means of securing the cleansing action of the tongue as a preventive of decay is often wholly neglected. For these reasons the method is not to be considered as approaching the ideal.

There remains the third method, by approach from the palatal side, which seems to me to combine more advantages and to have less objections than any other method. Disfigurement is more certainly avoided, and durability increased. Access is more readily and completely secured, and needless pain prevented. To be sure, one who uses the separator may use it here also, but it causes pain and is in the way; while with a little care one soon learns to operate successfully with no other separator than that which occurs naturally and temporarily as a consequence of the operation. Briefly described, the operation is this: The operator works with the mouth-mirror throughout, thereby seeing all parts and saving both himself and his patient from the strain of uncomfortable position. The palatal enamel, which can be spared, is cut away as freely as needed. In the smaller and medium-sized cavities it is re-

moved flush with the bottom of the cavity. A drill pit is made at each end of the groove across the cervical side, and another pit is made by drilling or cutting at that part nearest the cutting-edge, and when possible a shallow groove is carried along the labial wall of enamel. I am aware there is a theoretical objection to deep retention, but I find that this does not hold in practice; retention that retains is far preferable to retention about which there can be any doubt. This leaves a cavity accessible in every way, thoroughly illuminated by reflection, and with both labial and palatal edges in the best condition to be readily kept in view through the whole operation, and clean afterward.

After one filling of a pair is completed the surface is burnished, filed, or dressed down with strips, and used as a matrix against which to build the second filling. The pressure will cause a slight separation; enough, if the work is done with care, to allow of successful finishing. The finish may be to as full a contour as desired, but I have often found that a final shape a trifle less than full contour provides for cleanliness and durability in a very satisfactory manner.

I have purposely omitted detail as far as possible, my only object being to call attention to the fact that the easiest method is also the most certain to produce a beautiful and durable result.

PROCEEDINGS OF SOCIETIES.

THIRD INTERNATIONAL DENTAL CONGRESS, PARIS.

(Continued from page 153.)

THIRD DAY—FRIDAY, AUGUST 10, 1900—*Continued.*

SECTION V.—PROSTHESIS, DENTAL ORTHOPEDIA, AND FACIAL RESTORATIONS.

THE president called the Section to order at 4.10 P.M.

The first number on the program was the paper by Dr. BOUVET, entitled "An Appliance for Double Fracture of the Superior Maxillæ, also One for Double Fracture of the Inferior Maxilla in a Case of Double Fracture of Both Maxillæ."*

Discussion.

Dr. PONT. I had an opportunity to treat a patient who presented the same lesion as the one treated by Dr. Bouvet. At that time I did not know of the work of Dr. Bouvet. It was only after I had treated this case that I got some information by reading the thesis of Dr. Papin and the description of Dr. Bouvet. The appliance that I had constructed was not similar to Dr. Bouvet's, nevertheless I admire his appliance, and I am glad to congratulate him in the name of the Congress.

The PRESIDENT. We must congratulate our *confrère* for the presentation of exceedingly interesting appliances. You all know

*This paper is printed in full at page 251 of the present issue.

that cases of fracture are very limited in office practice, and that very often we are badly prepared to treat them. It is very seldom that such difficulties are met with as encountered by Dr. Bouvet, and which he has so successfully treated. It honors his ingenuity. You have seen that with the force exercised from the upper part of the head he has been able to reduce the fracture and to maintain the fragments. This is always an easy matter with the superior maxilla, but not so with the inferior maxilla; all kinds of devices and preliminary operations have been necessary. The combination of appliances as applied to the inferior maxilla is a very ingenious one. I will remark that the traction screws used by him may become of general use. We had already American appliances with which the maxillæ are kept immovable. With the bars used by Dr. Bouvet you only need bands, and not caps covering all the teeth.

I must nevertheless make two little criticisms. The first one is that he has used the plate which has always been used in cases of fracture of the superior maxilla. Generally caps are not used for the superior maxilla, but plates retained by means of clasps. You (addressing himself to Dr. Bouvet) had to deal with a complication,—I mean the separation of the inferior portion of the maxilla. For such cases the appliances used generally are not like yours; in such cases force is exercised by means of a sliding appliance (*coulisse*). With regard to the suture, I will say that you did not make a suture, but a union. The bony suture is altogether different, but it is certain that you have made a successful union by a combination of bands, rods, etc.

I will end my remarks by congratulating Dr. Bouvet on his ingenious appliance, and would tell him to continue his good work. We have not at our disposal a sufficient number of cases in order to make observations as valuable as he can make with his practice in the hospital and in the city where he resides. His will always be of the nature of important contributions.

Dr. BOUVET. Lately I have had two cases of simple fracture in the hospital of Angers; these occurred after the one that I have just described. I have used the screw system, and I did not take an impression of the jaw. These fractures were on the left side, between the canine and the lateral incisor. I only placed the metallic bar as advised by Dr. Martin. I placed it between the bicuspid. I approached the two fragments, which are now in place, and, as I have said, did not take any impression. This was an economy of time and of pain for the patient; besides, the irrigations of the mouth could be made with greater facility. I will not say that in a complicated fracture I should succeed so well, but in cases of simple fracture this system is very good.

The PRESIDENT. There is certainly a great advantage in using this method.

Dr. BOUVET. I do not mean that it will be serviceable in every case.

The PRESIDENT. There is an appliance devised by a foreign practitioner which puts both maxillæ in an immovable position.

Now, your method permits the lower jaw to move, and hence the patient can take the necessary nourishment, and at the same time you reduce the fracture.

Dr. BOUVET. The patients could leave the hospital three days after, while before they had to be nourished through a tube.

The PRESIDENT. Your appliance is a successful modification of another appliance, which is composed of a plate not united to an appliance exerting traction like this. You have completed an *ensemble* of appliances which are of easy application, and which may be very frequently of use.

The president then called on Dr. A. PONT to read his article (which here follows) entitled

FRACTURE OF THE TWO SUPERIOR MAXILLÆ, AND TREATMENT
WITH A VERY SIMPLE APPLIANCE.

It has been our privilege to see a case of fracture of the two superior maxillæ in the service of Professor Poncet. These cases occur very seldom. Dr. Poncet in his thesis (Paris, 1897) speaks of only sixteen cases, hence we thought that this observation was sufficiently interesting to be published; also because the consolidation was secured by means of a very simple appliance that has never before been described.

The patient was Mons. H., thirty-four years of age, with no hereditary or personal antecedents of any importance to point out. While serving in the army in the cavalry he was kicked by a horse, causing fracture of the four upper incisors and an extended wound at the level of the right ciliary region.

On the 18th of February, 1900, he suffered from a similar traumatism at the level of the upper lip.

When he entered the clinic there was a wound one centimeter below the anterior nares. This wound was very deep, and was three centimeters in length. The tip of the nose was pushed in and deformed, but no osseous fracture was found at the level of this organ. Ecchymosis of the infra-orbital regions existed. This condition was more marked on the right side.

The examination of the superior maxillæ showed that the bones were separated from each other, and could be moved in every direction. The two bones were raised and lowered during mastication. While in a condition of rest each maxilla was deviated in a downward, backward, and outward direction, and in such a way that all along the palate a median depression three millimeters in length was present. There were present two lines of fracture, one vertical, passing a little to the right of the median line, the other horizontal, passing a little below the malar bones. The upper teeth which remained were the two canines, the two bicuspid, the two molars on the right side, and one on the left. The two canines were slightly loose; the other teeth were quite normal. Nothing worthy of mention existed in the condition of the inferior maxilla.

The patient was suffering horrible pains; the masticatory movements were very painful. Saliva flowed constantly from the mouth. Respiration was difficult, and mastication impossible. Slight tris-

mus was present. The patient complained of a diminution of the sense of sight, but nothing could be found in the region of the eyes. There was a diminution of sensitivity in the infra-orbital region. Temperature was normal.

On the 19th of February the ecchymosis extended over a larger area. At the internal angle of the right eye a frothy spot of reddish coloration could be seen. A slight degree of subcutaneous emphysema was evident on account of the trismus and the acute pains felt by the patient.

When the superior maxilla was raised it was difficult to take an impression; nevertheless one was secured with modelling compound, and a vulcanite appliance was constructed similar to Kingsley's splint for fractures of the lower jaw. This was a temporary appliance, and only for the purpose of maintaining the two maxillæ until the permanent appliance was made.

This appliance was placed *in situ* on the 20th of February. On the 25th it was observed that the subcutaneous emphysema had increased, and the temperature was 39° C. The patient was restless, and it was feared that erysipelas would set in. The appliance was removed, and antiseptic washes, to be used very frequently, were prescribed. The pains during mastication had disappeared.

February 28th the temperature was normal. The subcutaneous emphysema had disappeared. The wound of the lip had a good appearance, and was healing very nicely. The mobility of the maxillæ still existed, but did not provoke any pain. Trismus had disappeared.

March 1st, an appliance made of vulcanite was placed in the mouth. This covered the entire hard palate, and also the teeth except the masticating surfaces. The piece was made high in front, and covered the gums as much as possible.

The appliance was divided by a fissure corresponding to the line of fracture. This was of a width equal to the space between the superior maxillæ. On either side of the median line three screws were symmetrically placed, each screw being connected with the one on the opposite side by means of a strong spring. The appliance was easily placed, and did not interfere with any physiological movement of the maxillæ. It was very well tolerated by the patient. The object of this appliance was to make continuous and slow traction in order to close the space between the two bones.

I considered it unnecessary to use an upward force, as the troubles during mastication had disappeared, and also because the articulation was again normal, and a bandage was all the additional appliance that the case demanded.

On the 6th of April the patient was completely cured. He ate with much ease. An appliance to replace the lost teeth was made, and he left the hospital.

This case reminds us of the classical cases of Wiseman, Simonni, Malgaigne, Bassereau, Goffres, Tyffe, Bryant, Walther, etc. Cases of bilateral and complete fracture of the superior maxillæ, as we have already stated, are very rare. Dr. Papin, in his thesis, only speaks of the occurrence of sixteen cases. (See also Dr. Mauri-

zot's thesis, Lyons, 1900.) These fractures are generally caused by falls or violent traumatisms in the region of the upper lip. Alphonse Guérin has demonstrated experimentally that a violent blow below the nasal openings can produce a transverse fracture passing a centimeter and a half below the malar bone. This fracture generally affects the two superior maxillæ, and can involve the palate and even the pterygoid bones. Sometimes the line of fracture is regular, and the entire hard palate is separated from the skeleton of the face; at other times the line of fracture is continued in an inward and posterior direction, separating the superior maxillæ from each other. In a case described by Walther the superior maxillæ, besides being separated from each other, were also fractured in two pieces in such a way that the entire upper jaw was divided into four pieces.

Among the symptoms of these fractures two are very important: the subcutaneous emphysema, more or less extended, but generally localized in the infra-orbital region, and the sensitiveness of the infra-orbital region.

As to treatment, it can be said that this question has been considered as a settled one since the time of Malgaigne. Efforts should be made toward preserving all the osseous splinters, no matter how small they may be. The mouth and nasal fossæ should be washed frequently with antiseptic solutions. The fracture is then reduced, a thing which is easily done, and then the parts are to be kept in apposition.

To maintain the fragments in position is sometimes easy, but quite often it is a very difficult affair. In such cases either metallic ligatures have to be inserted or special appliances constructed. The metallic ligature is evidently the method to be preferred when the fracture is a partial one, and when the teeth are not loose. It is a very simple and rapid method,—one which does not demand the assistance of a specialist. But when we have to treat a total fracture of both or even of only one maxilla, even though the teeth should be solid, the ligature will have to be abandoned for the use of a rubber appliance.

We will not mention the section of the osseous or even of the soft tissues,—for Walther, who practiced it, obtained a cure with much difficulty.

Among the appliances for the consolidation of fractures of the superior maxilla we find those of Salter, Graefe, Goffres, and Cumming. None of these appliances can serve as a type, for the majority of these devices are constructed for special purposes, and have to be modified according to circumstances. The surgeon and the specialist have to use their skill in order to find the best solution of the problem. It is for these reasons that we do not pretend that our appliance is useful and can be placed in every case. In this particular case it has been sufficient to correct the deformity and to bring about consolidation. It is a very simple appliance, and can be constructed by any dentist.

Discussion.

Dr. DOUZILLE. Have you often observed any trouble in the maxillary sinus?

Dr. PONT. Cases of this kind have been neglected, because the patient always presents a subcutaneous emphysema. Generally they are in a condition of coma, and hence the immediate troubles in the region of the sinus are neglected. It may be that later on such things are observed, especially if fissures exist, but if the appliance is well constructed the consolidation begins right away and complications in the sinus are less liable to take place. Hence I do not believe that they have been observed. I do not think that they have ever been pointed out. They can take place, and in such a case they are treated like ordinary sinusitis.

Dr. DOUZILLE. But they have not been specially observed?

Dr. PONT. No.

Dr. BOUVET. My first case was treated two years and a half ago. I have followed the case very closely, and I have not noticed any changes in the sinus.

Dr. DOUZILLE. Evidently such troubles could only occur immediately or very soon after the accident.

Dr. BOUVET. Changes in the sinus could occur, but in the case of the doctor that I have described I placed the appliance on Sunday, and on Tuesday, when I removed it to take the impression, consolidation had already begun. The patient felt very severe pain when the piece was taken out of the mouth, and he had to resume his former posture. We could see, then, that consolidation had already begun, and everything had to be done rapidly otherwise great resistance would have been encountered.

The PRESIDENT. We have now to thank Dr. Pont, who always gives us extremely interesting descriptions, which will serve as valuable contributions on the treatment of fractures of the superior maxillæ, which are more rare than fractures of the inferior maxilla. I will again thank Dr. Pont for his very important paper.

SECTION VI.—DENTAL EDUCATION.

SECTION VII.—(a) HISTORY OF DENTAL ART; MUSEUMS;

(b) LEGISLATION, JURISPRUDENCE, AND DEONTOLOGY.

SECTION VIII.—HYGIENE AND PUBLIC DENTAL SERVICES.

[JOINT SESSION.]

The president of Section VI, Dr. Queudot, called the joint session to order, and announced that Dr. Brophy, of Chicago, honorary chairman of Section VII, would preside.

Dr. QUEUDOT then said that his opening address would consist of the reading of his paper (which here follows) entitled

GENERAL AND SPECIAL EDUCATION PRELIMINARY TO ADMISSION TO
DENTAL SCHOOLS.

We understand by "general education" the scientific and literary knowledge that a student should possess previous to his entering a dental school. By "special education" we mean the amount of

medical knowledge that we would wish a student to have before his entrance into a professional school.

What should be the limits of this general and special education?

Some years ago it would have been difficult to answer this question in a satisfactory manner, on account of the prevalent incoherence and unsettled conception of the systems and methods which should replace the empiricism of the past centuries. But to-day, when these systems and methods are becoming generalized and more clearly defined, and when a scientific metamorphosis has given to our art an aspect of precision, our difficulties vanish, and our answer is easily given.

Could we dream of a grander perspective than the one that we see before us? We may choose as subjects for discussion and we may seek to further solve the majority of the great scientific problems. Anatomy, physiology, and pathology furnish us an extensive field. Bacteriology, which was born only yesterday, is to-day in your hands ready to enlarge nosology and to open to you fields whose extent is as yet impossible to conceive. Anesthesia, a discovery that we ourselves have the right to claim, remains our peculiarly privileged study. Prosthesis and orthopedia form the object of your constant efforts, and, judging from the wonderful results that have been obtained, future accomplishment in these branches will be yet greater. Teaching methods is a favorite subject of meditation with you, and the same is the case with deontology, which you are trying to propagate and the principles of which constitute the basis of our professional code. Such a program gives an idea of the high themes which properly contribute to the education of the dentist.

In order that the student may be able to profit from such studies, do you not think that his preliminary education should be as high as possible from a scientific and literary standpoint, as well as from the point of view of the special knowledge in anatomy, physiology, and pathology? An intellectual training as perfect as possible will be of great advantage; it will permit the student to choose his profession from among the whole body of the liberal professions, and if he elect to take up ours he will have thought about the matter with care and analyzed his abilities. A high intellectual training will put him in a position to understand the great problems whose nature we have just described. It will also make him perceive clearly his rights and duties, and he will have a greater influence over the patients that he will have to treat.

Our *rôle* is not confined to the office; it continues outside of our professional life, and is exercised wherever the influence of men of knowledge and intellect contribute to the greatness and glory of their respective countries. This education will enable dentists, by playing this beneficent *rôle*, to raise our profession from the discredit in which it lies even yet, and to prepare for it a place among the high liberal professions.

What should be this general education?

I will not hesitate to say that it is included in any of the bacca-

laureate degrees. Possessing this university degree, he will then acquire the medical knowledge which he needs in order to assimilate easily the lectures which he will hear in the professional school. We believe that as long as he has not given proofs that he possesses this special education his entrance to our clinics should not be permitted. We will go further, and say that the decrees of 1894, which authorize the student to use the forceps and to practice operations upon the dental organs,—that is, to act as a surgeon,—are contradictory to the law of 1892. This law claims from the dentist a medical knowledge, if not the most extended, at least the most sound. But to-day the student is in a condition of scientific inferiority.

You may argue about the excellence of the studies which he pursues in your evening lectures; but the sanction of those studies is only illusive, for the examinations passed in our schools are actually of no official significance. Hence we have the right to consider this student, at least from a medical standpoint, as ignorant, and this ignorance, even under cover of the school, puts him in the condition of an illegal practitioner of dental surgery.

We will not object to the clinical patients being operated on by students under the supervision of the professors, provided that the patients are not exposed to errors due to a lack of theoretical education. This condition of things exists, nevertheless, as we see students who have finished their studies in the school who fail before the Faculty of Medicine when they pass their first examination in anatomy. Would you dare to say that such individuals have had a sufficient medical education to be authorized to practice during three years in the mouths of our patients? This is a deplorable state of things, and one that is not in accordance with the requirements of the law.

It is necessary that medical initiation should be a preliminary requirement to the entering of our clinics, and that the examination of the branches that its study comprises should be passed, not before the student leaves the school, but before he enters upon the study of dentistry. What studies should this medical training embrace?

We believe that those demanded from the medical student before he is admitted to the hospital services should be demanded also from the dental student. The professors of the schools of medicine would know how to limit conveniently their teachings, and at the time of examination would not have to depend on a program to serve as a guide to their questions. These changes would not result in the suppression of the study of special sciences in our professional schools, but would liberate the schools from the teaching of subjects which have a distant relation to the dental institution. This measure would allow our professors to enter more into details in the teaching of their branches, so as to render their adaptation to dentistry more direct and more intimate. It would also have the advantage of giving to the student an education which would render him capable of understanding everything, and his cultivated intellect would follow without any effort the lectures on

odontology and stomatology. He would also have more time to devote to clinical practice. Then we should not have the condition of things that we witness to-day; that is, a group of students that pay more attention to the examinations they will have to pass before the Faculty of Medicine than to the technique of our profession.

He will be the good student who shall give to his teachers proof of his ability, and of his disposition for the *ensemble* of things which compose intelligence and morality. He will also give proofs of his medical knowledge. He will only have to use his abilities and to improve them, not for the purpose of following ordinary methods, but to practice dentistry in an intelligent and rational way.

To recapitulate, we will offer the following resolution:

"Resolved, That medical education should be given by the schools of medicine, and should be considered as a preliminary requirement for admission to the dental schools."

Discussion.

Dr. POINSOT. I approve everything that has been said by Dr. Queudot, but I believe that the actual dental student deserves more credit than has been given him. At the *Ecole Dentaire* the students are not as ignorant as claimed by Dr. Queudot. If they undertake any operation it is because the authorities of the school recognize that they are able to do it. I will remark that I supervise a dental service, and that I have been a professor in the *Ecole Dentaire* of Paris. When I intrusted the performance of an operation to a student it was because I knew that he could do it, and there was a gradual increase in the difficulty of the operations he was permitted to perform, in proportion to his growing experience and knowledge. In the dental schools the students are directly under the supervision of the professors.

To-day our students are not illiterate. The law requires them to have a baccalaureate degree or something similar. We do not admit everybody into our schools, hence there is no great difference between the student that enters the medical school and the one that enters the dental school.

You know that just now the question is of capital importance, and it would have been better if we could have discussed the matter in private and not in an International Congress. It must not be supposed that our students are ignorant, for, indeed, they are not. You know how the law of 1892 and the decrees of 1893 were instituted. If the law of 1893 had been continued, apart from the modifications of 1894, the dental standard would probably have been higher. I think that many improvements can be made,—that is certain, but everything cannot be done at once.

It cannot be said that our students are ignorant, or that they are not capable of undertaking dental work. They practice under the supervision of the professors of the *Ecole Dentaire*, who are the responsible parties, hence they should not permit the students to perform operations of a too difficult nature.

Dr. ROY. I am very glad to have heard Dr. Poinso

supposed danger to patients in permitting themselves to be treated by students. It seems to me that Dr. Poincot is right when he says that such a danger does not exist, if only for the reason that the professors supervise the students' work.

The danger referred to does not and should not exist in a well-organized school. In a school where the program is well arranged patients are not treated by students before they receive preliminary and indispensable information as to the treatment to be pursued. The majority of dental schools have organized preparatory clinical lectures, in order that the students should perform or should have learned by observation how to perform on extracted teeth the operations that they will be called upon to execute. Besides this, the most difficult cases are not treated by first-year students, but by those of the third year. It is for this reason that I dwelt in my communication to the General Assembly on the amount of training necessary for the study of clinical dentistry, and not on the minimum number of operations to be performed, as is the case in certain schools where they require a fixed number of operations. When the student has cleaned 150 mouths and extracted 150 teeth it does not mean that he will be able to treat a dental irregularity. Hence it is not only necessary to make a minimum number of operations, but, above all, those operations should be made according to a definite program, starting with the most simple operations. I do not believe that a student, even at the beginning of his studies, is liable to endanger the health of the patient. I agree with Dr. Poincot that the danger is purely imaginary. Nevertheless, there is evidently, and in spite of all, the necessity for their possessing a preliminary education before students are admitted to the dental schools. As I said in my own communication, the dental course should be prolonged. During the first and second years the student could follow the study of chemistry, physics, metallurgy,—of sciences, in one word. During the third year he could follow, in conjunction with mechanical dentistry, the study of general mechanics and a preparatory course in clinical dentistry. I believe that after a student has gone through an apprenticeship in prosthesis, and after he has followed the study of physics, chemistry, and general mechanics, he knows more than the student prepared according to Dr. Queudot's *rêve*; that is, by taking a year in the Faculty of Sciences, as done by those who intend to follow medicine,—for Dr. Queudot has pointed out the desirable measure that the same requirements should be demanded from dental as from medical students. Now, what studies are required from medical students? The baccalaureate degree, which consists of an examination in physics, chemistry, and natural history, and which is passed after spending a year in that faculty. Now, I would like to know if, after a year of study in the Faculty of Sciences, the student is better prepared to perform *ex abrupto* operations of dental character.

I will conclude my remarks by emphasizing the necessity that medical and scientific studies should be pursued in a precise and definite manner before taking up the study of operative dentistry.

If that is not possible I would prefer that things should remain as they are. It seems to me that the dangers alluded to do not exist, and if they do there is but one way to suppress them, and that is by organizing a preparatory training course before the practice of operative dentistry is undertaken.

Dr. BONNARD. Dr. Roy has said nearly all that I intended to say, nevertheless I will say that in our program there are two things that should be considered before anything else,—the absolute practice of operative and of prosthetic dentistry. After that we may consider the study of the sciences which, from the dentist's standpoint, can be considered as accessory sciences.

Since the promulgation of the law of 1892, which instituted the *certificat d'études*, a great change has been effected in the dental programs. Before that law was promulgated the students concentrated all their efforts toward acquiring the theoretical and practical knowledge of our art, but the law of 1892, which requires the *certificat d'études*, has changed absolutely the principles that had been inculcated by the founders of the dental revolutionary movement. Since then students have not tried to apply themselves to the practical side of the profession.

The majority of students study anatomy, pathology, chemistry, and physics in preference to the practical branches of dentistry. If the students are advanced in theory, unfortunately we see that they are not so in the practical branches. What is the cause of this? It is surely due to the fact that the Faculty of Medicine will not deliver a dental diploma unless the candidate answers questions on practice of medicine. Now, after this examination has been passed, the new graduate will have to follow purely practical dentistry, in spite of all his scientific knowledge.

I believe that our programs have been overcrowded, and I also think that gradually the dentists will abandon those scientific studies in order to devote themselves entirely to the practical branches, as taught in the Ecole Dentaire. Dr. Queudot has pointed out the fact that we see students who are regarded by the authorities of the school as brilliant ones, yet who fail before the Faculty of Medicine. The fault is not ours. In fact, if they impose upon the students high preliminary requirements they abandon the prosthetic part of the curriculum in order to satisfy this requirement, and if you increase these requirements by demanding a special diploma I believe that the measure is based on wrong ideas. The dentist is a practitioner, and should have a practical knowledge of his art. I admit that theoretical studies are necessary, but I do not think that they should be made at the expense of prosthesis and of operative dentistry.

If the resolution of Dr. Queudot should be passed it would be detrimental to the students. If you demand from the students a higher requirement than the one that they have to furnish to-day you are directing them toward a wrong pathway. They could be required to pass a certain time in the Faculty of Sciences, but to require that they should first acquire the medical degree is the thing that we do not want. What is the use of taking an entire course

in medicine when the student is going to practice dentistry exclusively?

I think that we have not enough experience with regard to the results of the measure which instituted the *certificat d'études* as a requirement to admission to the dental schools. We must wait until we see the results. We must not forget that the higher requirements have only been demanded for the past six years, and that only two or three series of students have graduated under such conditions. Let us leave things where they are. There should be required from our students a complete knowledge of general pathology; they should study prosthesis, and not theory; they should be made to pass examinations in prosthesis and operative dentistry. Make them practice on phantoms. I believe that our efforts should rather be directed to those points.

Dr. HIVERT. At the opening exercises of the Congress Dr. Gariel, professor in the Faculty of Medicine, made the statement that dentistry was a specialty of medicine. Hence if we are the practitioners of a specialty of medicine we must begin by acquiring the medical knowledge necessary and useful for our art. It seems to me that it is indispensable that our students should have a sufficient medical knowledge to judge of the importance of dental operations before they enter our schools. Dr. Roy told us a few moments ago that relatively few accidents can occur. I do not agree with him altogether. In our clinics students are allowed to perform operations whose importance they are incapable of appreciating. They ignore the fact that such diseases as angina, inflammation of the cellular tissues (phlegmon) may follow irrational operations. I believe, then, that it would be of great interest that the students should acquire medical knowledge before they decide to follow the specialty of the mouth, eyes, larynx, and ears. Dentistry is a branch of medicine, therefore students must acquire general medical knowledge before they undertake to follow this specialty.

Dr. VIAU. In this sort of discussion, which is so frequent among us, the principal argument seems to be that in the clinics patients are put under the student's care without knowing whether he may not perform an undesirable operation. I believe that on many occasions we have found that the student who has studied physical and natural sciences for one year, and who has passed a year in the hospitals, is no better prepared to take up the practice of operative dentistry, and would probably be less capable, than one who has passed three years in the laboratory of a dental surgeon. I believe that this is the absolute conviction of all. I do not pretend that the curricula of the dental schools do not need to be improved, and we are all working in that direction; but it seems to me that the principal argument of Dr. Queudot is not of real significance. Several professors of the Faculty of Medicine who examine our students in anatomy and physiology have made the statement that our students are of an excellent average. I will mention the name of Professor Robillat, who said that our students were not inferior to the average medical students who pass their examinations before the same board.

Dr. ROLLAND. It seems to me that it is the practical side of a question that we should discuss; we should consider the purposes that we aim to attain. Once the student has received his degree of dental surgeon his scientific knowledge disappears gradually, and he can remain an excellent practitioner through having learned simply the practical part of dentistry. I do not think for a moment that the theoretical studies should be suppressed; nevertheless, I do not admit that the student should be required to have considerable medical knowledge before he undertakes to follow dental surgery. It must be borne in mind that the efforts that must be made before a clear understanding of anatomy, pathology—in one word, of the scientific problems—can be had, a long time is required; four or five years may pass by before that point is reached. Very advanced studies cannot be reached before one is capable of determining what profession he will follow. We should feel satisfied with the requirements as demanded by the law; that is, the *certificat d'études* and the baccalaureate degree. When a student comes to us it is then that he should be taught the theoretical questions. I can only be a partial judge in dental questions, as I am a physician and inclined toward the theoretical questions; but when I consider the interests of the students I believe that the curriculum of the School of Medicine is too complicated for the end to be attained. I think that general knowledge should be imparted to the student, but that too much importance should not be paid to details. I think that such questions as, Give the origin and insertion of a given muscle, or, What passes at a certain point? are not the kind of questions to be asked. I think that the theoretical studies should be limited exclusively to the head and parts which concern the dental surgeon. When the student possesses such knowledge, and if he limits himself to operations which are nearly always of the same nature, the danger is very small.

With regard to the question of making the student practice during six months or a year on a phantom or on the cadaver, I must say that I am not of that opinion. The student operates under the direct supervision of his teachers, and if he happens to make a mistake we must not forget that such a thing could also happen to the professor. Who is the practitioner that can say that he has never made a mistake? The essential point is, not to give to students very difficult operations, because in such cases the most insignificant fault may destroy the usefulness of the entire operation.

The conclusion is that we should do everything we can for the practical branches, and simply what is necessary for the theoretical ones.

Dr. SIFFRE. Until now I have observed a great difference of opinion in the observations of the different speakers. Some seem to think that the less educated the dentist is the better he will be; others say that his education must be highly scientific. It seems to me that there will come a day when prosthesis will diminish in importance, or will even disappear. If you say that two-thirds of the time should be given to prosthesis, I cannot explain the condi-

tion of things in this Congress. Every day all sorts of questions are discussed in the different Sections except questions of prosthesis.

You have to-day in many cities in France a number of dentists who call themselves dental surgeons, and who possess a very limited knowledge of dental matters. Yesterday two interesting communications were made to the Congress, but neither was of a prosthetic nature. Do you pretend to make use of prosthesis without having previously studied pathology and special therapeutics?

I believe that the remarks of Dr. Queudot have been misunderstood. I think that he demands that the dental student should be taught medicine in order to practice to advantage the dental profession.

Dr. GODON. It seems to me that the discussion has deviated a little. The title of the paper contributed by Dr. Queudot is as follows: "General and Special Education Preliminary to Admission to Dental Schools." What should this preliminary education be? Ought it to be altogether a practical one, or a scientific one more complete than that which is given to-day? The nature of Dr. Queudot's paper might have been the cause of a deviation from the points to be discussed. What we can summarize from his report is that he is a partisan of a preliminary scientific preparation superior to that which is given to-day to the dental students.

I would like to remark that in this session our French *confrères* have had the floor very often. It could not be otherwise when treating of questions of national interest and when discussing the rules of the Faculty of Medicine, but it must not be forgotten that we are discussing a question of international interest. As a matter of course we can refer to the conditions existing among us, but we must discuss the question from an international standpoint.

I agree with the speakers who remarked on the exaggerated statements often made regarding the danger to patients who have their teeth cleaned by students. They have spoken of phlegmon and of angina. I will tell you that I have studied dentistry and also medicine, and I have never known such things to occur. They are certainly big words which serve to promote a discussion. During twenty years we have been the object of exaggerations that I want to point out now. It is not right that, under the pretext of operations that the dentist has not and never will perform, the student should be made to spend five years in the school of medicine. I have studied all those things, but I have never met any cases in which I could use this knowledge.

Allow me to say that we have gone beyond the limits of this question. We should ask the speaker, before he tells us the conclusions that he has reached, from what standpoint he looks upon it; everything depends on the standpoint, and forgetfulness of this has made us wander from the theme intended to be discussed to take up a dissertation on the medical and scientific knowledge to be demanded from dental students, and to abandon the question of preliminary education. I would ask you to take into consideration my communication, which is summarized in a table which you will

find in the 9th fasciculus, which was distributed yesterday. This table, which I will ask you to examine, is the synoptic table of the methods of teaching that we have adopted in the Ecole Dentaire of Paris after twenty years of experience. In fact, I give you in that table the result of the experience of men who have studied this question during twenty years, and who have exerted themselves to improve and to increase constantly, within the limits of possibility, the knowledge of young dentists.

When I refer to the table of studies of the Ecole Dentaire of Paris, observe that very probably, with at least very little difference, it represents the program of studies of the majority of the dental schools in France and in the whole world. Examine and see if it is possible to-day to demand more scientific and medical knowledge without diminishing the time absolutely necessary for the technical teaching. I do not believe that with the existing program of studies this is possible, and those who have worked on this question, and especially Dr. Roy, are of the same opinion. Reference has been made to the plan of extending for two years more the time employed. Drs. Queudot, Siffre, Hivert, and myself are of the opinion that they should be employed in taking up practical studies to be given in the school of medicine. We are divided into two parties,—those that want the practical technical teaching to be increased and those that wish the dentist to have a sufficient medical training. I would like to see the medical teaching increased for some years, but just now I would prefer that this measure should apply to the technical training. The scientific and medical knowledge demanded from students now has reached its maximum. I think that the program is sufficiently charged. Our professors complain of the great development which of late has been accomplished by the scientific and medical teaching at the expense of the technical teaching. Our students have not sufficient time in which to study either mechanical or operative dentistry.

Dr. LEMERLE. I just want to say one word in regard to the communication of Dr. Queudot. A few moments ago Dr. Roy told us that he thought that there was nothing to be changed in the existing program of the dental schools. To-day the first-year students follow the lectures on chemistry, physics, and bacteriology, but the time employed for this purpose is very limited. I find that an hour a week is very insufficient. The students are not properly prepared. Some years ago the course in the school of medicine was a five-year one; to-day it has been reduced to four years, and the students have been sent to the Academy of Medicine and a new degree has been created. I believe that it would be a good thing for our students to take the examinations in philosophy and natural sciences; they would enter the school with a knowledge of physics, natural history, and even dissection. I consider that when a student had acquired this knowledge he would be in a condition to follow the dental lectures with greater advantage. It would also allow us to abandon in our schools the teaching of chemistry and physics, which should not be given there.

Dr. ROY. I regret that I have to take the floor again and to

prolong this discussion. As you know, I have written an article on everything that concerns teaching methods. I made up a program that might be considered as intended for an ideal one,—this program to be followed by every school according to the particular law of the state where the school is located and according to the particular rules of the individual school, trying always to maintain as nearly as possible this ideal program. In my paper I endeavored to sum up the number of hours devoted to lectures, taking into consideration the time employed for theoretical, prosthetic, and hospital work. I reached the conclusion that in all schools the number of theoretical lectures is nearly the same, but there is a great difference in the teaching of the non-dental branches. In the school of Geneva more than one-third of the total time employed is given up to the study of non-dental branches, while in the Ecole Dentaire of Paris one-thirteenth of the time is given to the study of non-dental branches and more than one-half of the total time is given to the technical branches. Hence in the Ecole Dentaire of Paris less than half of the total time is given to theoretical studies, while in Geneva a great deal more time is spent for this purpose. I reached the conclusion that when in a school the medical teaching predominates, the technical teaching decreases in importance, and *vice versa*. As time is not elastic, and as we have to give theoretical, medical and practical instruction, it is evident that some one among these three branches will have to predominate. In our schools theory occupies a position inferior to the practical branches. Theory can be learned very easily. There are numbers of doctors of medicine who decide to follow the dental profession because they judge from the theoretical branches that dentistry is very easy, but I estimate that a doctor of medicine needs three years of study before acquiring sufficient dental knowledge. I also consider that it is impossible to demand that the dentist should pursue medical studies which require eight or nine years. This would mean the death of dentistry and of our patients' teeth.

Reference has been made to the diploma in philosophy and natural sciences. I repeat that this diploma is a bad preparation for the dental aspirant. I simply demand that the candidate should have sufficient general knowledge before he is admitted to the dental schools. The *certificat d'études* and the special certificate seem to me to be sufficient preparation for the dental student.

Besides the apprenticeship in prosthesis, I am going to speak on the teaching methods in our schools. You know that apprenticeship presents many objections, and does not constitute a well-organized teaching method. I believe that the dental and non-dental branches should be taught in the school for the following reason: because in the Faculties of Sciences and Medicine the lectures are intended for students who want to attain the degree in sciences or medicine, and their programs are too extended for our students. Every student who is working for the degree in medicine or sciences can dispose of more time than our students. The result would be as in the dental school of Geneva, where out of three years and a half of study one year is passed in the Faculty of

Sciences, one in the Faculty of Medicine, and the remaining eighteen months in the dental school. This is not the ideal of the dental profession. In the Ecole Dentaire only the non-medical branches, general anatomy, physics, chemistry, receive a development proportionate to the necessity of the dental branches. It is for this reason that I have recalled my program where a minimum program has been established.

Dr. POINSOT. I believe that the program of the Ecole Dentaire will give very satisfactory results. A few years after it was organized there was a scheme to increase the difficulties of the requirements for admission to the school. I will recall the observation of a professor who said, "You are trying to increase the requirements for admission to the school. I have just seen and studied its actual program, and I will confess that, in spite of the degrees of doctor of medicine, of pharmacist *de première classe*, and of doctor of sciences that I possess, I am not very sure that I could pass them in a creditable way."

This question of the program received our attention when I was director of the Ecole Dentaire. This was at the time when the program of 1893 was being prepared. One day I was asked by a printer of the Faculty of Medicine to make a *vade-mecum* in order to better determine the branches to be studied by the dental students. I was very much embarrassed. I went to see the authorities of the Faculty of Medicine, and I asked them for the program. Do you know what they answered me? They said, "We have no examination program, for the dental students cannot have more privileges than the medical students." It appears from this statement that the examiners do not make any difference between the dental student and the medical student. This is something that we should notice, for it is an unjust procedure. I would propose that at the end of each year the student should pass examinations in relation to their studies.

Dr. GODON. I have been during two or three years a partisan of the idea that the student should not be admitted to the dental schools unless his preliminary scientific education was a high one. I have examined the question, and to-day I approve of the method followed in England, where the student receives a theoretical and practical prosthetic training either in the school or outside before matriculating.

The PRESIDENT. I agree perfectly with Dr. Siffre. He has expressed exactly what I wanted to say. I mean that medical education should be considered as a preliminary requirement for admission into the dental schools, and should be given by the school of medicine. This education could be as low as you wish, but it should be given before the student enters the school. The dental schools will then make of them dental practitioners, as it is their right and duty to do.

Dr. GODON. The president tells me to read my communication entitled "Scientific and Medical Education Necessary for Dental Surgeons," but, as we have just discussed the same question, we should only go into a repetition of things if my communication were read.

Dr. POINSOT. Dr. Godon emphasizes the necessity and duty of the dental students to attend surgical clinics, and I agree with him entirely. I assure you that the student can derive great knowledge from attending those clinics.

A MEMBER. It is a thing that exists already. Our students can follow the hospital services; they have all the privileges required.

Dr. ROLLAND. These discussions are deeply interesting. There are some members who want to prolong the course to four years. I think they are wrong. I consider that a student should study prosthesis before entering the school. When he should have acquired enough prosthetic knowledge he would pass a theoretical examination on the work done during the three years of preliminary training. It must not be forgotten that much can be learned in laboratories of dental practitioners.

Discussion closed.

The president then called on Dr. HEADRIDGE to read his article entitled "Comparative Study of Dental Diplomas." [This article and the discussion following its reading will be published in a future issue of the DENTAL COSMOS.]

Dr. P. STEVENIN then read his article (of which an abstract here follows) entitled

THE UTILITY OF PERMANENT INTERNATIONAL DENTAL COMMITTEES.

When the organizers of this Congress desired to invite the dentists of the different countries to contribute by their papers to the work of the Congress, they were in great difficulty as to how to reach them. They could not address themselves directly to every one of the dentists of the world, because they only knew a small portion of them; and it was only after much work, an enormous correspondence, and great expense that they were able to communicate with the associations whose members are the authorized persons to represent their countrymen. In many places it was very difficult to form regular committees approved by the majority of dentists of the country.

In the Congress of Paris of 1889, and in that of Chicago of 1893, the members of the national committees were directly nominated by the committee of organization. This method has many disadvantages.

We are glad to extend our thanks to the Committee of Organization and to the national committees for the good result obtained by their work. Will all this work, correspondence, and expenditure be of no further use when this Congress shall have reached its end? It would be a very advantageous plan to have the Committee of Organization remain as a permanent body, so that it might keep in touch with the dentists of the different countries.

Were the committees created for this Congress to continue in their functions it would be a simple thing to organize another Congress. Their services could also be of use for the purpose of facilitating harmonious and useful relations between the dentists of the various countries.

I will quote an example in order to illustrate the benefits that could be derived from the establishment of permanent committees. In our Section much has been said about unworthy members of our profession, and of the best methods to stop their dishonest acts. It happens very frequently that when a charlatan is discovered he goes to a different country, where he begins anew all his quackery; and very often is admitted into an honest professional society, for the reason that it is very difficult to get information as to his morality. Were permanent committees established in the various countries they could give confidentially all the required information.

A proposition such as that which I am now making requires to be presented to an assembly like this to have an opportunity of reaching a favorable solution. In other circumstances months and years of active correspondence would be insufficient to realize that which we can do to-day in a moment. It is only necessary that all the countries that have sent delegates to this Congress should elect a number of dentists to represent their *confrères* in questions of international character. And if some countries have not sent representatives to this assembly, I do not see any reason why they, too, should not act in the same way. It could be decided that the committees organized in every country should be in office until the next International Congress, and that they should adopt the following rules:

Vacancies should be filled by dentists nominated by the members of the committee. The committee shall nominate every year, at least, a president and a secretary, and shall inform the other committees of the result of the election. The sessions shall be held in the president's office.

I will now make the proposition that the committees should elect every year two members to represent them and to assemble in a place agreed upon, where all professional questions could be discussed.

I will conclude by asking—

First: That the committees nominated for this Congress continue in office until the next International Congress.

Second: That the delegates of these committees should form an International Dental Federation.

FOURTH DAY—SATURDAY, AUGUST 11, 1900.

GENERAL ASSEMBLY.

The meeting was called to order by the president at 1.45 P.M.

Dr. RICHARD-CHAUVIN read his communication (of which the following is an abstract) entitled

NEW METHOD OF FILLING TEETH BY MEANS OF BLOCKS OF HARD PORCELAIN.

We have been filling teeth by means of fusible enamels since 1892. We demonstrated in the Ecole Dentaire of Paris in 1893 the way of taking the impression of interstitial cavities of more or less regular forms. The difficulties experienced with the glass powders and the

pseudo-porcelains which deteriorate so easily from contact with the fluids of the mouth were the cause of our researches to obtain inlays of hard porcelain, and even since 1894 we can already observe encouraging results. Let us state right here that our porcelain is superior to that used in making mineral teeth, from the standpoint of resistance to the influence of the oral fluids.

The great obstacle to the use of true porcelain lies in the difficulty of obtaining a sufficiently high temperature at which to fuse it.

The degrees of resistance of enamels used in dentistry vary from the soft glass to the hardest argillaceous pastes, but containing always in their composition silicates of fusible bases.

To-day, with the means at our disposal, it is not possible to fuse a powder of kaolin or feldspar if it does not contain fusible bases, such as silicates of potassium and sodium. In certain powders that we have used we discovered the presence of lead, on account of the black coloration which appeared in the inlays after they had been in the mouth only for a short time. These powders, which are easily recognized after they are fused, give a dense enamel, polished and of good appearance. We believe that they were prepared with *débris* of the glass used for optical purposes (the flint glass and crown glass used for the manufacture of optical appliances contains a great quantity of lead salts) that had been colored by adding pieces of glass bottles such as are used to keep substances from the influence of light.

In formulæ the constituents of which are silica, sodium, and calcium, or silica, potassium, and calcium, the sodium and potassium enter in the proportion of 12 to 15 per cent. The kaolin of Saint-Yrieix, which enters into this combination, contains only slight traces of sodium. It is evident that better formulæ could be combined. It should be remarked that none of the enamels in use to-day give perfect results. In order to obtain a relatively easy fusibility, a condition which is indispensable on account of the appliances that we have to-day, fusible bases which are disintegrated by the fluids of the mouth have to be used in the making of enamels.

All those who use porcelain know the difficulties of getting the right shade. When the cavities are labial or buccal the right color can be obtained, and it is hard to distinguish the inlay. The same is not the case when the cavities are interstitial ones. Here the shadow produced by the neighboring tooth on the inlay makes the line of junction of the porcelain and the tooth very conspicuous, and the filling appears darker than the tooth. In order to diminish this inherent defect in all porcelain inlays a shade a great deal lighter than the tooth should be selected. The cement should also be of a lighter shade. It is better to use a thick inlay wherever possible. All these details are too well known to insist any longer upon their importance. With a little experience very satisfactory results are obtained, in spite of all difficulties.

The methods of fusing the porcelain whose formula approaches as much as possible that of pure kaolin are not numerous. The White teeth can be fused only in high-heat furnaces. The old practitioners probably remember that the Belgian teeth were a

great deal less hard than the White teeth. They had to be fused in high furnaces that had to be lighted the day previous to the day of the fusion. We have tried to fuse our powder in an earthen furnace heated by gas, and the combustion was intensified by compressed air; yet, notwithstanding the intense heat, we could not carry the fusion even to the biscuit state,—nevertheless we know that it is only by the aid of oxygen that we are enabled to fuse the hard porcelain. Very distinct differences, however, must be recognized as to the way in which the oxygen or the compressed air is used for increasing the heat of the furnace. In our method of procedure we direct the oxyhydrogen flame upon the piece to be fused; it is the only way to obtain a sure result.

The following are the substances which enter into the composition of kaolin and of our powder:

Kaolin—Silica, alumina, sodium, magnesium, water.

Our Formula for the Powder—Silica, alumina, iron, calcium, magnesium.

FUSION OF THE PORCELAIN BY MEANS OF OXYGEN APPLIANCES.

Technique.—The appliances necessary for the making of porcelain inlays are: 1. An oxygen reservoir. 2. A blow-pipe.

The reservoir that we have devised is composed of a cylinder of cast iron, similar to the one used in general therapeutics for keeping oxygen under pressure; a differential valve whose principle consists of a marker made of ebony, which is turned by a differential and retarded movement in such a way that one turn corresponds to an elevation or depression of the marker of half a millimeter. The result is that the effort necessary in order to open the valve is very trifling.

(Dr. Richard-Chauvin went on to describe his reservoir, pointing out its advantages. He then described his blow-pipe, which is composed of a cylindrical tube mounted on a tripod. At the lower third is a hemispherical cupola, to which a system of double valves is attached. These two valves consist of one for the oxygen and one for the gas. The essayist gave a lengthy description of his blow-pipe, and spoke further of the advantages to be derived from the use of his improved appliance.)

As already said, the temperature at which the porcelain fuses necessitates the use of platinum in the matrix or impression of the cavity. The taking of this impression requires some manual skill. It is harder to take the impression with platinum than with gold, but with a little experience as perfect an impression can be obtained. Platinum is a good material for these matrices; the results are very satisfactory.

In order to take a perfect impression it is indispensable in cavities that are wider at the bottom than at the orifice to give by means of cement such a shape to the cavity that no undercuts will be present. When the cavity is an approximal one the teeth should be sufficiently separated, in order that the impression may come out without being warped.

The piece of platinum foil for the reproduction of the cavity should be of sufficient length to cover the lingual and labial sur-

faces of the tooth. When the platinum has been introduced into the cavity, gradually,—always trying not to tear the foil,—it is a good thing to press strongly against the margins of the cavity, holding the matrix by the portions covering the lingual and labial sides. When everything is in position the borders of the cavity should be marked by means of an instrument of metal or agate. If the foil does not move in the cavity it can be considered that the impression is a good one. We have said that the tearing of the foil is to be avoided, but this condition is not an absolute one. Often our matrices have been pierced through, yet the inlays did not suffer any change.

The matrix should be prepared in such a way that the platinum should not fuse when in contact with the oxyhydrogen flame. This is done by covering all the platinum, except the part which represents the cavity, with a paste of calcium carbonate and water. It is then dried gradually over the gas flame. The matrix prepared in this way is ready to receive the porcelain paste. The paste, when introduced into the cavity, must be of a thick consistence. It should fill the concavity completely, for we must take into account the contraction of the material. By proceeding in this way the inlay may require only two burnings, but as a general rule three are necessary. There is no advantage in getting only to the biscuit point in the first burning; it is better to burn the porcelain completely, so as to avoid at once the further contraction of the material fused. The burning is done directly in the flame. The operation is performed as follows:

First. The paste is dried thoroughly and gradually by passing over the flame and withdrawing it in order to allow the vapors of water to escape. When it is well dried there is no danger that it will leave the matrix, and a higher heat can then be applied.

Second. The oxygen should be let on progressively by turning the regulating handle. When the paste has undergone a high temperature, and when there is no more risk of cracking, put the porcelain in direct contact with the flame.

Third. If the operation has succeeded the porcelain contracts toward the center. More paste is then added to fill up the spaces between the burned porcelain and the margins. To be sure of the penetration of the porcelain into the most minute fissures, it should be introduced in the more liquid state, and then thicker paste can be added. The inlay is then burned for the second time.

Note that every time that the inlay is burned (after the first burning) its surface should be covered by a slight layer of wet powder. If this precaution is not taken the intense heat developed by the oxygen fractures the inlay in the center. This accident does not often occur with small inlays, but commonly with large ones. But even if the fracture takes place the inlay is not lost; it can be repaired. Were we to cover all the surface of the inlay with porcelain and burn it immediately after, the result would be a failure, for the fracture would be visible. The repair should be made in the following way: The inlay should be finished completely without paying any attention to the fracture. With a very fine grinding

wheel the fissure is made as deep as possible, and is filled with a thick paste. The surface of the inlay should also be covered with a thin layer of porcelain, and the inlay is submitted to a new burning.

We will emphasize again the necessity of painting the platinum matrix with the calcareous paste, which is used to prevent the platinum from fusing; without this precaution the metal would not resist the heat developed by the oxygen. It is very important that the porcelain should be fused exclusively by means of the oxygen portion of the flame. During several months we had many failures from the mixing up of the two flames.

Without desiring to talk of the details of the operation of inserting inlays, we will say that, while the majority of authors who have treated this question, as also many practitioners, neglect the mechanical means for retention and depend entirely on the adhesiveness of the cement, we make regular undercuts in the substance of the inlay.

The author, in conclusion, called attention to the following points:

1. The hardness and resistance of the inlay.
2. The simplicity of the technique and the rapidity with which the inlays are made.
3. The small amount of heat caused by the burning,—the use of the oxygen only lasting the time required to pass the porcelain over the flame for a few seconds.
4. The inexpensiveness of the appliances. The installation is so simple that the porcelain work can be made easily in the office.

Discussion.

Dr. DE MARION. I thank Dr. Chauvin for the paper upon his researches that he has just read, and, above all, for the results that he has communicated to us,—results that he has obtained by experimenting on the qualities of different porcelains.

Until now we had to work with materials of whose impermeability we could not be sure; this is not the case to-day, as we have materials possessing superior qualities.

His researches will probably furnish us better materials. For continuous-gum work this will be of an enormous advantage, and will satisfy not only our professional artistic feeling, but also our patients. I thank Dr. Chauvin for having given us many technical details, but I will slightly reproach him for not having spoken in a more scientific manner. I would wish to have heard a more exact formula.

When we make the analysis of kaolin we find that it is a hydrated bisilicate of aluminum. This bisilicate of aluminum when submitted to different temperatures loses its water of hydration, and is decomposed at a temperature of 1200° C., and fuses at 1700° C. What are the materials used by Dr. Chauvin to unite these preparations of silica and of aluminum in his composition? Is it by the presence of the fusible materials, calcium hydrate, calcium carbonate, which are only fusible at very high temperature, or by the

presence of calcium sulfate? Or is it by the presence of talc? I would like to hear Dr. Chauvin answer all these questions. This would allow us to make not only inlays, but also continuous-gum work, which we believe is of greater importance. We must go into these questions. We should know if we may apply this paste on English or American teeth. We all know that Hall's paste, which we use for continuous-gum work, when used upon English teeth discolours them; when it is used upon American teeth they do not undergo any change. These questions should be not only discussed, but also published, in order that those who make this kind of researches should not be obliged to repeat the work already done.

I have done a good deal of porcelain work. I have made enamels according to the nature of the flame, reducing or oxidizing; and Dr. Chauvin knows the difficulty of fusing in the oxidizing flame, which is in the middle. You are obliged to pass the reducing flame before reaching the oxidizing flame.

Dr. CHAUVIN. That is an error.

Dr. DE MARION. I know very well that you have modified the burner, but I would like to know what coloring matters we should use. We know that in order to get certain colors, as, for instance, yellow, we must use a very high temperature. To get this color we use the salts of uranium or titanin acid; to obtain a red color we can only use the salts of gold. These cannot be used if the temperature has to be raised to 1000° C., as they would disappear. Well, then, what are the colors which resist so well that they do not change when they are passed through the two flames that I have mentioned? I know that there is no necessity of passing through the two flames when using his device, but in the ordinary blow-pipe it is the gas which is on the outside and the air on the inside. In his modification the gas is surrounded by the oxygen,—I believe that this is the modification made by Dr. Chauvin. The result is that he obtains a flame which, while not being so hot, nevertheless burns all the particles of carbon and gives a sufficient amount of heat. This appliance is a perfect one. We know that the electric furnaces give this temperature, but they become spoiled very easily when we burn this sort of material.

Dr. CHAUVIN. With regard to the points upon which Dr. de Marion has reproached me, I will say that I have prepared four papers for this Congress; I give demonstrations every day. I beg your pardon for referring to myself, but I am absolutely tired, and for this reason I have not discussed the scientific side of the question. The technical demonstrations that I gave this morning seemed to satisfy our *confrères*. They saw with what facility I obtained enamel plates. Later on I will read another article which will complete this one. If this answer satisfies you I shall feel very happy.

Dr. HESS. I thank Dr. Chauvin very much for his interesting communication, and for his demonstrations which he gave at the Ecole Dentaire; they were highly interesting.

Discussion closed.

(To be continued.)

PENNSYLVANIA STATE DENTAL SOCIETY.

(Continued from page 164.)

FIRST DAY—*Afternoon Session* (continued).

FOLLOWING the discussion of Dr. Burke's paper on "The Best Filling-Material for the Temporary Teeth," a paper entitled "Gold-Blindness, or Retinal Asthenopia, and Its Treatment" was read by the author, L. WEBSTER FOX, A.M., M.D., Philadelphia.*

Discussion.

Dr. GERHART, Lewisburg. I know that I only voice the feelings of all those who are present when I speak of the sense of gratitude I feel toward Dr. Fox for this paper. The thing that struck me particularly in his discussion, outside of the line of his own specialty, has been the common sense he has applied to the rules he has laid down for us. It is only an evidence of his knowledge of the unity of physics. He lays down rules that will maintain the health of any man, whether he be a dentist or not. It is not necessary for me to say that in order to maintain the health of any particular part the health of the whole body must be maintained, and it must be kept in accordance with the rules and laws that govern nature. He has given every evidence that he has studied in a broad way the specialty he professes, and I know that some of the things he has said are so from personal experience.

As you all know, I am a poor country dentist who is compelled to look a great deal on green trees, and around whose office and home there are green trees at every season of the year when it is time for them to be in leaf; and these maintain a healthy condition of the sight, and have helped me to attain to the age to which I have attained. And this I know is due in a great measure to having followed the very rules Dr. Fox has laid down to us,—to keep ourselves close to nature; to exercise temperance in life. I would like once more to express my gratitude to him for his paper.

Dr. H. N. YOUNG. While I am very grateful to Dr. Fox for the information he has given us, I would have been more so had I heard the same paper a half-dozen years ago. I think the question of eye-strain is little considered by the average dentist. Some years ago I built a residence, and in it an office; and, thinking it was necessary to have a great deal of light, I built a bay window to my office, so that I was almost surrounded with light. Before it was finished Dr. Gerhart called upon me, and I expected to receive from him his complimentary approval, but instead thereof he said: "Young man, in a few years it will be necessary for you to have glasses if you operate in this room." At that time I had unusually good sight, but in less than two years I had to be fitted with glasses. The surrounding light was so strong that in a very short time I began to have headaches, particularly in the afternoon, and, thinking the difficulty arose from some stomach trouble, I permitted it to

*Dr. Fox's paper is printed in full at page 121, DENTAL COSMOS for February, 1901.

go on. I have since tried to correct the cause and improve the condition somewhat by having the office papered green. I think the majority of us overlook this question of light and give more attention to the situation of the room, more consideration to the position where they want to practice, than they do to the feature of illumination. Our profession should be educated more upon this subject. I made a special effort to have a paper presented by an oculist before the Susquehanna Dental Society some time ago, and being on the Executive Committee this past year I made the same attempt; but after having invited three oculists, they all finally declined. I must thank Dr. Fox for his valuable contribution, and I know the profession would be greatly benefited if we had more of such papers.

Dr. JESSE C. GREEN, Westchester. During the reading of the paper I could not help looking back to a time, years ago, when some of us were engaged in manufacturing our own porcelain teeth, and remembering the effect upon the vision produced by looking into the furnace during the burning process; and I was impressed with what the speaker has shown to be the result of overstimulation of the retina in producing a blind-spot. This condition was frequently produced, temporarily at least, in the process of tooth-burning, because after looking at the incandescent porcelain and then away from the furnace there was always that blind-spot which he has described, and it required some time for the eye to resume its normal condition. This was pursued for years, and I feared at the time that the sight would be injured.

I remember the case of Daniel Neall, of Philadelphia. We all recollect that his sight failed early in life, and he said to me once: "My eyes are not exactly useless, but they are unfortunately losing their usefulness to me as a dentist. I am in the room here daily, but I should have gone out into the country. I should have viewed the green fields, and should have looked on green trees; that is what my eyes wanted." But he left it a little too long, and the result was that his sight failed him. For many years I have not been engaged in that work of burning porcelain teeth, and my eyes to-day (probably I should not say it so positively) are as good as they were thirty years ago. But it has been my rule when doing a long-extended operation, requiring a steady looking at the gold for that time—I am very apt to say to my patient, "Please excuse me for a few minutes," and I run out three or four blocks and look on the green fields; and I find I have been benefited thereby. Some patients may not like it, but I invariably say, "I am going," and I want to have my patients feel when I say anything to them that I mean just that thing.

Dr. WALTER H. NEALL. I have had some experience with this blind-spot described by the essayist. On two occasions it developed in connection with a coryza. I was at that time under treatment by a physician, and I found, a day or two after taking his medicine, looking into the patient's mouth it was hard to see what I was doing. There was apparently a film over my eyes. After discontinuing the medicine this disappeared. I should like to say

further in reference to this paper that I believe in eating very little meat. Most of my food consists of fruit and vegetables, with plenty of water. If I eat meat, it is not oftener than once a day. If too much meat is indulged in one becomes lazy and sluggish.

With regard to exercise, I was early taught by my father that after every day's work some exercise should be taken, and I had in my library Indian clubs and dumb-bells for that purpose. The last twelve years I have lived in the country, and have had to walk to and from the train, or sometimes to run. Every day when I go to my luncheon I walk a considerable distance, so that altogether I am probably getting as much daily exercise as the essayist has advised. Before my residence in the country I resided in town, having my office in the same house. The day's work brought with it so much fatigue that I did not go out. I found I was beginning to suffer from dyspepsia, and I have to thank my country life for a marked and continued improvement in health.

With reference to the remarks of Dr. Green in regard to burning teeth, my father was interested in that practice for many years, and I well remember that during the burning process it was his custom to wear a pair of green spectacles, so that bears upon the point referred to by the essayist with regard to the beneficial effect of green upon the eye.

Dr. Young has spoken of the character of the light in dental offices. For many years I used a north light altogether, and I had a bay window such as Dr. Young described. My patients complained frequently of the excessive light, so that I have lately changed to a southern exposure. With the south light I get some sun, but by the adjustment of curtains I am entirely free from the direct sunshine; but I think every dentist ought, if possible, to have sunlight in his room during some part of the day.

Dr. YOUNG spoke approvingly of golf as a kind of exercise well adapted for dentists, being less violent than cricket or tennis.

Dr. JAMESON also spoke favorably of golf as an exercise.

Dr. SCHULL asked the essayist which light he deemed best for the office of a dentist.

Dr. Fox. I think a northern exposure is better. There seems to be less refulgence of the rays of the sun. Where there is too much light there is overstimulation. In Philadelphia in some of the old houses the architects who built them used a pink-tinted glass, which helps to utilize the yellow rays. It is an imported glass that came from France seventy-five years ago, and the secret of its manufacture seems to have been lost. A southern light modified by such a glass will be an ideal light.

Dr. KLUMP, Williamsport. I was very much interested in the subject, because I was a sufferer to some extent many years ago in the same direction. I think the records of this society will show that about twenty years ago I presented a paper dealing with this very same subject. I think the paper is entitled "Hygiene in the Dental Office." I know I referred to the relief of the eyes by looking upon a green place, and I think I also gave some suggestions as to the light a dentist should have in his office. I should

like to ask Dr. Fox if he does not consider that the light should be from a side and back, rather than facing the operator?

Dr. Fox. I think so, decidedly.

Dr. GERHART. If you will permit me, I will speak of a matter of which Dr. Young has reminded me. I have always used only the upper half of a window to light the room in which I operate, and have thus made my work the lightest place in the room; so that whenever I raise my eyes from the work they look into a darker medium, a darker space than where my work had been. The result is that when I return to my work again the eyes adjust themselves with a great deal more ease than when I look out of the window or into some brighter medium. I received this suggestion by noticing the office window of a dentist in Arch street, Philadelphia. The window had a northern exposure, and in the Venetian blinds he had, a little above his head, a separate lift for the slats, so that upon lifting this portion of the blind no light entered the room excepting through that particular space. And it was that observation which induced me to make some experiments and set me to thinking, and finally led to my operating in a light coming from one side only, leaving the rest of the room dark. It was that which I had in mind when I suggested to Dr. Young that he had too much light for his place of work, because when he lifted his eyes he lifted them to a medium just as bright as that in which he was doing his work. I knew a dentist who worked with the direct rays of the sun upon his work, and inside of three years that man was totally blind, and went through a life of many years in blindness and suffering. That, of course, was because the eyes were taxed too much. The light of the sun and the yellow rays were too abundant on his work.

Dr. LOOMIS. I feel greatly indebted to Dr. Fox for the information I have derived from listening to his paper. He has given us many valuable suggestions with regard to our offices. I think the placing of plants in the office is a great benefit. The other day I had a patient in the chair and there were some ferns in the office, and, referring to them, she said to me, "How restful that is!" I paid no attention to the remark until hearing the paper by Dr. Fox. Many of us know that after operating on a large gold filling we turn the head away from the patient. Probably few of us know why we turn the head away. We know we are tired,—but why? The paper has been valuable in giving us the reason for this tendency. The essayist has spoken of the effects; I wish at some other time he would tell us how to correct these conditions after they have been produced, in addition to telling us how to prevent them.

Dr. REGISTER, Philadelphia, described the benefit he had derived by covering the wall opposite his office window with a thick growth of ivy, he having found by experience that the green tint was particularly restful to his eyes.

Evening Session.

After an announcement by the Banquet Committee, Dr. GRANT

MITCHELL, Pittsburg, read a paper entitled "Are the Morbid Processes Variouslly Designated 'Interstitial Gingivitis,' 'Phagedenic Pericementitis,' etc., Inflammatory or Necrobiotic?'"*

Discussion.

Dr. KIRK. Before attempting to open the discussion on this paper I wish to express the pleasure I have had in listening to it. It seems to me to be one of the very best papers bearing on this peculiar complexus of diseases that I have ever had the privilege of listening to. I approach the discussion of it with some hesitation. I want to treat my friend Dr. Mitchell fairly in the matter, but I am not sure that I clearly understood his main proposition. If I understand it correctly, he does not regard so-called pyorrhea alveolaris or phagedenic pericementitis as an inflammatory process, at least in its initial stages, but rather he regards it as a progressive molecular necrosis due to a profound nutritional disturbance in the cells of the tissues composing the retentive apparatus of the tooth. I am reminded in this connection of the legend of the two travelers who having passed a shield upon the highway fell into a controversy as to whether it was made of gold or silver, and after a heated argument finally decided to go back and examine it, when it was discovered that the shield was silver on one side and gold on the other. I quite agree with Dr. Mitchell in so far as he takes the position that the initial predisposing lesion in this disorder is not inflammatory in character, but that subsequently it is inflammatory. I think there can be no doubt whatever as to this if we understand what inflammation means. Certainly, in all cases where we have pus-formation in connection with this disease it measures up to the modern definition of an inflammatory process.

I have given much study to the etiology of the disorder in question, and the more I investigate it the more I am led to believe that the earlier stages of the disorder are in harmony with the facts as expressed by Dr. Mitchell. There are certainly two definite conditions which must be recognized in order to quickly understand the pathology of this disorder: First, the group of conditions which act as predisposing causes. I have gotten into the habit of regarding this pathological process from the point of view of what might be called the "relative potentialities" involved. The disorder represents an error in or aberration from the standards of normal vital resistance. What we call vitality or vital resistance to disease invasion may be expressed as that form of energy which is the result of the entire nutritional process normally performed. We take into the body certain substances as food, representing a definite amount of potential energy; this energy is rendered kinetic by the processes of metabolism, and where the metabolic changes are normally carried out the highest expression of vitality results and the highest resistance to disease invasion is established. Interference in any way with the nutritional processes proportionately lowers the power of vital resistance, and disease invasion becomes

*Printed in full at page 227 of the present issue.

relatively easier. Now, all of the conditions referred to by Dr. Mitchell—those produced by alcohol, improper food, temperature variations, mechanical irritation, etc.—disturb the normal nutritional processes and lower vital resistance. Let us take, for example, the disturbance of nutrition which results from the deposition of calcareous matter upon the surfaces of the teeth. When such a deposit of tartar occurs and impinges upon the surface of the gum margin irritation of the cells of the part results, and their nutrition is interfered with. A localized lowering of vital resistance follows, making invasion by mouth bacteria possible. The disease becomes at this point inflammatory, and cell death follows. The clinical aspect of the pathological process is superficial, and ulcerative in type. Deep invasion of the tissues is not possible, because of the high vital potential of the tissues, which are not subjected to the mechanical irritation of the calcareous deposit; but in a case where the vital potential of the whole organism is lowered as a result of the excessive use of alcohol, exposure to cold, or any of the conditions which bring about malnutrition, the deep invasion by bacterial forms becomes easy, and the extent of the inflammatory process is proportioned to the lessened degree of vital resistance.

The observations of Peirce, in which he found the uric acid diathesis to be more or less a constant factor in relation to certain types of phagedenic pericementitis, are interesting in this connection, as showing that the disturbance of general nutrition caused by the uric acid diathesis is sufficient to reduce the vital resistance of the pericemental membrane to a point where bacterial invasion becomes possible. It is in this class of cases that we have the pyorrheal disorder taking on that peculiar form which has been variously described as "abscess upon teeth with living pulps," or as described by D. D. Smith, "pericemental abscess." The inflammatory focus is deep-seated in these cases because of the general lowered vitality of the patient. It seems to me that in view of the data now at our command we should be able to dismiss from our discussion of this problem the inquiry as to whether it is of local or constitutional origin, and confine our investigations to a study of the predisposing and the exciting factors in its etiology.

I am in agreement with the essayist that the necrobiotic phase is probably a constant feature in the earlier stages of the disorder, but that it is subsequently a true inflammation I have not the slightest doubt. The emphasis which the essayist places upon the nutritional disturbance which is the predisposing factor is most important, and indicates that in order to successfully cope with the disease we must do more than treat it locally. The constitutional error, whatever its origin, must be sought out and eliminated by intelligent hygienic and therapeutic treatment.

Dr. BRUBAKER. I feel as though I ought to apologize to the society for allowing myself to take the floor to speak upon a subject of which I practically know nothing, but the very interesting paper of Dr. Mitchell has opened up a line of thought to which I will give expression. Through association with some of my dental

friends I have been brought up on the idea that the disease under consideration is a nutritional disorder, the local expression of a generally disturbed nutrition, that disturbance being partly hereditary and partly the result of all the factors which have been alluded to. I have been led to believe from various reasons that the immediate cause of this disease is a deposition, in an impaired peridental membrane, of uratic and calcium salts, and that these salts are the immediate cause of all the phenomena which are exhibited from that time forward.

The main proposition of Dr. Mitchell's paper, if I understand him, is this: that the primary cause of this disease is a molecular death of the cells of the membrane, to which he has applied the term *necrobiosis*. He did not state any specific cause for the death of the cells of that membrane which would lead to a deposition of these salts from the blood. If we were to assume for a moment that this is a fact, that there is for some reason a molecular death of the tissues of the peridental membrane, then we can account for the deposition of the salts from the blood. There may be, and probably is, a great deal of truth in what has been said in this connection. As a possible cause of this *necrobiosis* we may assume a loss of function on the part of the nerve-cell which controls the nutrition of the peridental membrane. In what is known as the *gouty diathesis* the nerve-cells of the body are as apt to be impaired in their activity as any other part, and whenever these trophic centers are impaired from the circulation of waste products in the nutritive fluids surrounding them they lose their power of controlling the nutrition of the structure in question. We see this in various parts of the body. In that nerve disease known as *locomotor ataxia*, in which there is a destructive process going on in the nerve-cell, we sometimes see a great deal of *necrobiosis* taking place in the alveolar process,—to such an extent that a large part of it can be readily detached. It is quite possible that in this disease—*pyorrhea alveolaris*, by which name it is usually known—there is a disturbance in the functional activity of the nerve-cells governing the nutrition of the peridental membrane, and in consequence it undergoes this gradual molecular death. As soon as that takes place we have these various salts deposited from the blood.

There is just one other word I wish to say in regard to what has been said by the previous speaker. If I understood Dr. Kirk correctly, he said the *exciting* cause of the inflammatory condition is the entrance of a specific micro-organism into the peridental membrane. I cannot believe that this is the exciting cause of the inflammation; on the contrary, I fully believe that the inflammation and the death of the structures are caused by the deposition of the calcium salts, and it is only when the vitality of these tissues has been destroyed by the inflammatory process that this specific organism can go into the dead structures and bring about that stage of inflammation which is known as *suppuration*.

Dr. KIRK. I would like Dr. Brubaker to explain that matter a little further, and in order to bring it out I will ask him at what stage he regards inflammation as originating. What I want to

get at is his idea of inflammation, and what an inflammatory process is.

Dr. BRUBAKER. I have had discussions with Dr. Kirk on previous occasions on this subject. A statement was made by Dr. Mitchell here a little while ago as to what are the conditions which constitute inflammation; these were heat, redness, pain, and swelling. These are the four cardinal symptoms which indicate inflammation. If a man has a splinter in his finger he will in a short time have pain, heat, swelling, and redness. If he goes to a surgeon, the surgeon says to him, "You have an inflammatory condition." The direct cause of it is this irritant or this splinter. Upon the removal of the irritant the inflammation begins to subside; that is, the swelling begins to disappear, the pain disappears, and in a short time the inflammation is terminated. If the cause of these symptoms is removed at this stage, then the inflammation has terminated naturally and normally by resolution; but if this inflammation destroys the vitality of the parts and they die, and with their death they undergo dissolution and at that moment are invaded by a specific micro-organism, then we have a new condition established and superadded to the inflammation, and that is suppuration. That is one of the effects of inflammation, and not inflammation in itself.

Dr. KIRK. When I referred to the inflammatory process I had reference to the suppurative stage of it.

Dr. GERHART. I am pretty sure that no one in this room knows less about the thing under discussion than myself, so it would seem almost preposterous that I should put my oar in this discussion; but as I have listened to the paper and to the discussion of it I have gathered this one thing, that the disease has its inception as an inheritance. Dr. Brubaker brought out one point that struck me with a great deal of force. He tells us that in locomotor ataxia there are presented the same conditions that we have in the lesion which has been discussed. Here, it seems to me, we have an opportunity to go back of this hereditary condition. It is a well-known fact, as all text-books will tell you, that locomotor ataxia is one of the signs that result later in life when syphilis has been suppressed by drugs. Now, then, if this be so, is it not possible that this whole condition has its origin back of anything that has been spoken of,—has its origin as the hereditary transmission of syphilis or a syphilitic disease?

Dr. CRYER was called upon, and answered that he preferred to listen to others who were better posted on the subject than himself.

Dr. GREENBAUM was called upon, but did not respond.

Dr. STELLWAGEN. If there is anybody here who knows less about this subject than Dr. Gerhart claims to, I guess I am the man. It is a very old disease,—a great deal older than our essayist tells us. It is a question whether it should be classed as a disease or a natural physiological process. We know that different tissues of the body have different periods for living. We know, Mr. President, that the teeth originate from the skin; in their growth and development they are in many ways very similar to the hair.

We find this same condition affects the hair of the head. We know that in due time certain of us have a bald spot. This troublesome affection of the teeth has probably occurred ever since mankind came into existence, and one may rather imagine it will continue as long as mankind is found upon the face of the earth. But this, of course, does not excuse us for neglecting the study of it and finding out its causes or means for its palliation if we can.

I agree with what has been said, that it is just as impossible for one to practice dentistry intelligently without a general knowledge of the whole human system as it would be for a man to attempt to run a locomotive without knowing the properties of the various coals used and the materials and metals, and the action of the multiplicity of levers, etc., which is required to be known to run such a machine. Evidently, as the essayist says, there is a connection between nutrition and digestion, and in cases where the organs of the latter are exhausted or weakened, as he suggests, by continued nibbling or eating, there we would have resulting weakness, and as a result of that of the digestive organs, probably weaknesses elsewhere. Therefore, it is a good remedy to first remove the local irritants that have become attached to the teeth, and then look to the digestive and, I would add, the circulatory apparatus.

Anything that irritates the gums unnecessarily is, of course, objectionable, yet a certain amount of local stimulation or massage I have found to be advantageous, such as rubbing the gums with the finger. The intermittent pressure by the point of the finger is very often an excellent means of inducing a better circulation or getting rid of the sluggishness of the blood-movement, which, after all, is the most likely cause. The recession of the gums is one of the evidences of old age, which comes with some people earlier, with some later. Some get bald soon, and some get bald late. If we could get rid of or cure either it might prove a great blessing, but it is doubtful if we ever will have such a blessing, or that we will ever be able to get rid of bald heads or loosened teeth except by beheading or extraction. Cleansing of the parts, keeping them absolutely free from salivary calculi, and the removal of all unnecessary and foreign substances, and at the same time the inducement of a healthier circulation of the tissues by natural stimulation, particularly with the finger, is as yet the best that can be done. I am looking for the first case that can be considered as permanently cured. Many cases have been improved and many where its progress was arrested, but rarely if ever one that did not return in course of time, the teeth were lost, or the patient died.

Is it right that it should be looked upon here and discussed, as it was at the meeting of the American Medical Association, only as a disease? To my mind it is one of the natural coincidences and a normal consequence of age. If these cases are thoroughly studied, the heart and circulatory apparatus will probably show complication with them; there frequently is a lack of tonicity in the capillaries. In other words, it is one of the first signs of advancing old age.

Dr. REGISTER. How do you account for the cases occurring in

the very young, one, for instance, of a boy fourteen years of age, a typical case?

Dr. STELLWAGEN. I would ask Dr. Register how he accounts for the fact that some boys die at the age of fourteen? The degenerations that are the evidence of age come at various times. If the weakest member or tissue happens to be the gum or its margin around the teeth, we might see that evidence shown very early. As a rule, however, in these young cases it can generally be accounted for by mechanical means, such as salivary calculus; perhaps irritation brought about by the use of the brush may be responsible for a certain few cases. An undue or too great stimulation is as bad as too little.

(To be continued.)

MARYLAND STATE DENTAL ASSOCIATION.

THE first quarterly clinic of the Maryland State Dental Association was held at the St. James Hotel, Baltimore, on the afternoon of Saturday, November 10, 1900.

Evening Session.

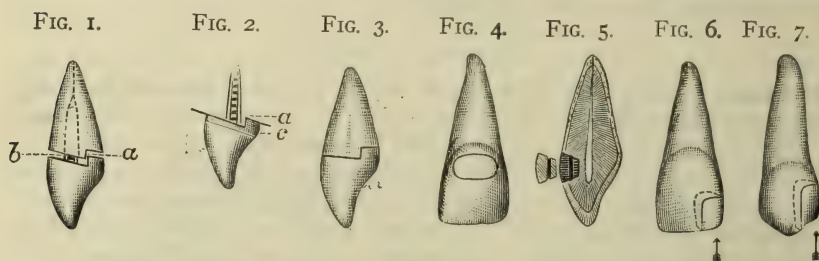
In the evening the association met in Royal Arcanum Hall and discussed the clinics as follows:

Dr. JOSEPH HEAD, of Philadelphia, in introducing the subject of "Porcelain Inlays and Crowns" (the subject of his demonstration in the afternoon clinic), said: By the public at large, dentists are regarded solely as fillers of cavities and restorers of lost teeth. While these acts perfectly performed confer no small dignity, such titles now do not begin to cover the scope of modern dentistry, and it is most essential that the general public should be educated to an extent that will create an efficient co-operation between patient and dentist, for without such co-operation the best results cannot be obtained. The dentist of to-day should not only restore lost tooth-structure, so that the restoration will be permanent, but he is under moral obligations to make the restoration artistic and of such a character as will conduce to the general hygiene of the mouth as a whole.

The baneful teachings of ten years ago that brushing of the gums and teeth was harmful is only one of the numerous errors that has to be removed from the minds of many patients. And the prejudice in favor of a so-called permanent filling irrespective of appearances is a species of barbarism in the light of our present dental knowledge that should be strenuously opposed. The modern teaching of cutting away large quantities of healthy tooth-structure in the front of the mouth so as to prevent possible future decay, and thus necessitating a large, unsightly display of gold, is a mistake almost as grievous as that made by Dr. Arthur of twenty years ago. For if permanence and strength is the sole aim, irrespective of appearances, an all-gold crown with a fine edge, so burnished as to avoid a shoulder, would accomplish that object much more

effectively and with much less pain to the patient. For a central incisor whose cutting-edge and approximal surfaces are conspicuously filled with gold is not less unsightly than an all-gold crown.

Every dentist knows that when he fills a tooth the health and cleanliness of the mucous membrane around the tooth is as much to be considered as the tooth itself. Contour that will preserve from future decay is not more to be considered than contour that will preserve the delicate structures of the interdental space, for on the health of the gums depends the health of the root. Any procedure that tends to permanently break the union of the periodontal membrane with the gum does perhaps a necessary harm, but if, in addition, the dentist places adjacent to that laceration an appliance that of necessity will prove a locus for putrefactive growth, that dentist compels the patient to endure such risk of injury to the general system that any compensating esthetic or masticatory advantage sinks into humiliating insignificance. As Dr. Kirk demonstrated last May in Albany, the etiology of pyorrhea alveolaris has been largely made out; filth deposits around the necks of the teeth are usually the prime agents in forming the pus-pockets.



The collar crown going under the gum cannot always be avoided. It in many instances does more good than harm, but we should always bear in mind that any band placed on a tooth so that it will harbor germs will prove a possible seat for the beginning of pyorrhea alveolaris. I wish to show this evening a bandless crown that seems to have the strength of the collar crown, with none of its disadvantages. It is, however, only applicable to solid roots that are capable of being given the proper dovetailed shape. Take, for instance, a central or lateral incisor, or a canine tooth whose crown has broken down to within one-third or one-quarter of the gum. Shape it thus (as in Fig. 1, *a*), with a notch on the palatal surface. The dotted lines show the outline of the enlarged root-canal. A Logan crown of the proper color should be ground and fitted so that there will be ample space between the root and the porcelain, as is shown in Fig. 1, *b*. The tooth is then removed, and soft platinum foil, one one-thousandth of an inch in thickness, is burnished to fit the cut surface of the root. Over this platinum stiff plastic wax is placed, and the Logan crown is jammed upon it, driving and retaining the foil into all the interstices of the root's surface. After the wax (Fig. 2, *c*) is cool the platinum and crown can be removed, having the appearance of Fig. 2. A little investment can now be placed about the pin and the under portion of the platinum. When

this is hard the whole may be dropped into boiling water, which will remove the wax, and the space thus left can be filled up with the proper colored porcelain and baked. The platinum foil should be then pulled off, and if the work has been properly done the crown when cemented into place will be found to fit the surface of the root perfectly, as in Fig. 3.

The advantage of this crown needs no explanation. The smoothness of contour affords no lodgment for putrefactive growth, recession does not reveal an unsightly metal ring, and the notch sustains the force of mastication almost as well as though a band were used. This method is not new, and my excuse for dwelling on it lies in the notch *a*, which obviates the danger of splitting the root that usually confronts the dentist who uses the ordinary Logan crown.

I am frequently asked, "Will porcelain fillings last?" and I invariably reply, "If they are well put in." But if any dentist takes up porcelain work for the purpose of having an easy time, I warn him to desist at once. He will find that he must take as much if not more pains than he took with his gold work.

Two classes of bodies are at present before the profession, the low-fusing and the high-fusing. The former can be melted in a gold matrix; the latter must be melted in a platinum matrix. Many attempt porcelain work and fail, but it has been my experience that ten times as many fail with the low-fusing as with the high-fusing bodies. In making a porcelain filling, success or failure depends largely on the preparation of the cavity. The edges should be absolutely smooth and sharp, with as few compound curves as possible, and the walls at right angles to any possible force of mastication. The bottom should be flat, and the sides so shaped that mastication will tend to drive the finished filling in, not out of position. When the cavity is thus prepared soft platinum foil one one-thousandth of an inch in thickness, that is held immovably over it, should be coaxed into the cavity with spunk or bibulous paper as far as possible without danger of tearing, and when the edges have been sharply defined the platinum can be spun to the bottom with a ball burnisher. A platinum matrix made in this way has practically perfect adaptation. In cavities of the labial class, such as in Fig. 4, the depth should always be sufficient to insure good anchorage, the bottom flat, the walls on a slight bevel, and the undercut midway between bottom and enamel, as in cross-section in Fig. 5. There should be only one position for the porcelain filling under pressure, and that the correct one. The porcelain inlay cannot be undercut too carefully. In cavities of the corner class, such as are illustrated in Figs. 6 and 7, care should be taken to shape the cavity so that the walls at the cutting edge will be at least at right angles to the force of mastication. The adaptation of the filling should be so perfect as to constitute almost a dovetail. The dotted lines show the outline of the filling within the cavity. Any force applied in the direction of the arrow, at the extreme point, it will be noticed, would keep the filling still more firmly in position. With bicuspid and molars all frail walls should be cut away, and good, smooth, sharp edges obtained, and the filling inserted as in

Fig. 7. Here it will be noted that the force of mastication, as with the other fillings, still tends to keep it in position. This cannot be too strongly emphasized. The cement should fill up the crevices and sustain the biting force where necessary, but the dovetailing of the porcelain should always second it in every way possible.

Discussion.

Dr. C. J. GRIEVES, Baltimore, said he personally knew nothing more difficult than the proper adjustment of the Logan crown, and thought the method shown by Dr. Head was a great improvement over those in use heretofore. In regard to porcelain inlays, the main uncertainty seemed to be whether there would be a recurrence of decay around the filling. Dr. W. D. Miller recently gave the results of an extended investigation on this subject, and reported that under gold fillings he found decay in twelve per cent. of the fillings; with amalgam forty per cent., and with the oxyphosphates about sixty per cent. His theory of the cause of the recurrence of the decay was that it started in retaining spaces where the filling could not be made to remain in close contact with the dentin, and any filling which did not restore the contour of the teeth invited recurrence of caries. In porcelain we had a filling-material which promised to save teeth where gold failed, and that would combine permanent contour with the saving property of the plastic.

The question of cement was most important. Cements we knew were permeable to moisture and to germs. At the edge of a porcelain filling there was a certain amount of washing out of the cement, and without doubt bacteria invaded this cavity, but they were away from their natural habitat and could not do much harm. Porcelain fillings had the advantage over gold fillings that their insertion did not require the severe malleting required of gold, and this malleting was likely to injure the dentin in addition to being a strain on both patient and operator. Dentists were taking up porcelain fillings slowly, but it was well to be conservative with a new material. He believed that porcelain would be found to be very serviceable when properly manipulated. The weakness found in the line of cement was more apparent than real. The profession had been using cement for years to hold crowns in place, and as a rule there was little recurrent decay under such crowns; and with the closer adaptation of the porcelain fillings there would probably be a still greater freedom from caries.

Dr. H. M. SCHOOLEY, of Washington, wanted to know if Dr. Head would put porcelain fillings in incisor teeth where the cavity did not extend to the cutting edge as well as where it did extend to the cutting edge. Would he use them to replace the edges of teeth that were worn away? Also, would he put porcelain fillings in molars?

Dr. E. E. CRUZEN had listened with interest to Dr. Head's talk, and was pleased with his description of the way to set a Logan crown, though, as Dr. Head had said, the method was not entirely new. He was struck with his description of the notch on the root, which was the real point of value.

Dr. A. C. BREWER, Baltimore, asked Dr. Head what platinum and what cement he used in porcelain inlay work. He said many dentists thought that it was less difficult to use low-fusing body than high-fusing. This was a mistake, because if the heat was raised one or two degrees too high it would burn out the color of low-fusing body. The matter of strength did not make so much difference. Jenkins's body was strong enough. He had never had one to break, and but one to come out.

In preparing a labial cavity in an incisor he always made the cavity square and the retaining points about half-way up the wall of the cavity, and preferred to grind the bottom of the cavity slightly concave. This gave a body of cement at the bottom to grasp the filling and a rough surface at the side.

Dr. GEO. E. HARDY, of Baltimore, said Dr. Head made no reference to the fissure in bicuspid.

Dr. HEAD said the porcelain filling was made irrespective of the fissure, and then the fissure was filled with gold. It was not because he could not do gold work that he had taken up porcelain fillings, nor did he think that any dentist who could not do good gold work would succeed with porcelain. In molars gold inlays usually were to be preferred to porcelain, on account of the great increase of strain to which such fillings were subjected.

He was pleased with Dr. Grieves's remarks, especially what he said about Miller's investigations in cement. He was especially glad that the harmlessness of bacteria when removed from their normal environment had been brought out. Gutta-percha fillings, as all knew, would leak moisture and bacteria, but would nevertheless prevent decay. Bacteria to do much harm required to be numerous and to have proper food, and when back of gutta-percha fillings were like an army that was broken up and separated from its commissary. He would absolutely back up what Miller said about the large percentage of recurring decay under cement fillings when put in as many insert them, but it was well known that cement properly guarded by gutta-percha would preserve teeth excellently. A cement filling properly guarded, even though the cement leaked, was about the best preserver of a frail tooth. If cement were not a good preserver of tooth-structure porcelain fillings would have no excuse for existence.

In answer to the question, How far back in the mouth could porcelain fillings be used? he said as far back as the operator could make a good matrix,—of course depending somewhat upon the skill of the operator. If the patient had a large mouth, and would open it wide enough, he could put porcelain in molars, and could use it in bicuspid and incisors in any cavity. When porcelain was used at the cervical margin, with the gum coming down over the edge of the cavity, the platinum, when properly burnished, would push back the gum and make it possible to get a good matrix with ease.

He was glad the difficulty in fusing the low-fusing bodies had been mentioned by Dr. Brewer. It is as easy to make a good platinum matrix as a good gold matrix, but it is much easier to

handle the high-fusing body than the low-fusing body. He said that he used Harvard cement and White's platinum one one-thousandth of an inch in thickness.

Dr. B. HOLLY SMITH asked Dr. Head if he would build up worn teeth with porcelain if the occlusion was direct.

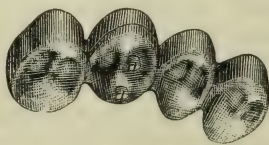
Dr. HEAD said it depended somewhat upon the force of mastication. If this were great he would build up these teeth with 22 k. solder, as this alone would withstand the strain. But if the patient were a lady desirous of preserving her looks he would use porcelain tips, and without regard to the number of teeth affected. If it were good practice in a single tooth, why should it not be good for more, even as many as ten or twelve?

Dr. HARRY E. KELSEY, Baltimore, who was on the program for a clinic on "Porcelain Crowns and Furnace," said he had been unable to give his clinic as there was no gas in the room where the clinic was held, and therefore he had not been able to operate his furnace.

He had intended to illustrate that it was not so difficult to work with a high-fusing body as many thought. This supposed difficulty brought about the extended use of low-fusing bodies, but with a proper furnace there is no reason why any one may not successfully use the high-fusing bodies.

Dr. JOSEPH HEAD said the great advantage of an electric furnace lay in the fact that it is worked without either dust or noise, and that there was no danger of gassing the porcelain. He considered that electric furnaces were for these reasons to be preferred, but for a gas furnace the one shown by Dr. Kelsey was the most ingenious he had ever seen, as it gave great heat, there was no gassing, and the muffle was not liable to burn out.

Dr. C. S. GORE, Baltimore, exhibited a sectional bridge held together by screws (see illustration). In describing the same he



said that bridging where the lines of the two abutments are parallel is a very simple operation, but where the lines of the abutments are not parallel and can never be made so it is quite a different matter. The object of the sectional bridge is to overcome the necessity of grinding the abutments until they become cone-shaped, and in many cases extremely sensitive.

In a case where the two teeth to be used as abutments lean toward each other his plan of construction is as follows: Prepare each abutment and crown separately, without regard to the other. With both crowns in position on the teeth take plaster impression and bite at the same time. Divide the impression first; remove the anterior half of the impression, then the posterior; then place the parts together and set the two crowns in the impression and pour the model with plaster and sand. Now fit the dummies to the

abutments and invest model and all. After soldering all together drill two small parallel holes through the thickest part of the dummies, and with a very fine ribbon saw bisect the piece at about a right angle to the two parallel holes. Place the two parts in position in the mouth, and enlarge the holes with oiled burs. This will overcome any contraction which may have taken place during soldering. Remove the parts from the mouth, and cut threads in the holes and make screws of heavy platinum-iridium wire. Set both sections at one mixing of cement, and place the screws in at once.

The manner of making a bridge for cases of this character was a new one as far as the author was aware, and he was very glad to offer it to the profession, as it lessens the sacrifice of tooth-structure and promises more permanence to the abutments, and consequently to the usefulness of the bridge.

There was no discussion on the subject, but many members expressed their appreciation of the value of Dr. Gore's improved method of construction.

ALLEGANY COUNTY (N. Y.) DENTAL SOCIETY.

THE above-named society held its sixth annual meeting in Belmont, N. Y., on Wednesday, January 2, 1901.

Dr. H. B. Huver, of Buffalo, entertained the society with a lecture on "Bacteria," illustrating the same by lantern slides showing the methods of making cultures, etc.

The following officers were elected for the ensuing year: P. D. Greene, Belmont, president; J. Floyd Sortore, Belmont, vice-president; W. W. Coon, Alfred, secretary; Jas. Wardner, Friendship, treasurer.

W. W. COON, *Sec'y.*

HARVARD ODONTOLOGICAL SOCIETY.

AT the annual election of the Harvard Odontological Society, January 31, 1901, the following officers were elected for the coming year: Dr. Joseph Totten Paul, president; Dr. Robert Tucker Moffatt, recording secretary; Dr. Arthur Henry Stoddard, corresponding secretary; Dr. Lyman F. Bigelow, treasurer; Dr. Harry W. Haley, editor. Executive Committee, Robert T. Moffatt, D.M.D. (chairman), William P. Cooke, D.M.D., Frank T. Taylor, D.M.D.

ROBERT T. MOFFATT, *Corresponding Sec'y.*

SOUTHERN DENTAL SOCIETY OF NEW JERSEY.

AT the annual meeting of the Southern Dental Society of New Jersey, January 16, 1901, after Dr. C. S. Stockton, of Newark, had read a paper, entitled "Our Calling," the election of officers for the

ensuing year took place. The result follows: Dr. O. E. Peck, of Bridgeton, president; Dr. Charles P. Tuttle, of Camden, vice-president; Dr. T. V. Smith, Jr., of Camden, corresponding secretary; Dr. A. K. Wood, Camden, recording secretary; Dr. Mary A. Morrison, treasurer. Executive Committee, Dr. A. Irwin, chairman; Drs. J. E. Duffield, Camden; J. G. Halsey, E. E. Bower, W. A. Jaquette, and A. B. Dewees, Camden.

DENTAL SOCIETY ANNOUNCEMENTS.

VERMONT STATE DENTAL SOCIETY.

THE twenty-fifth annual meeting of the Vermont State Dental Society will be held at Pavilion Hotel, Montpelier, March 20, 21, and 22, 1901.

THOMAS MOUND, *Secretary*,
Rutland, Vt.

DENTAL SOCIETY OF THE STATE OF NEW YORK.

THE thirty-third annual meeting of the New York State Dental Society will be held on Wednesday and Thursday, May 8 and 9, 1901, in the assembly hall at Hotel Ten Eyck, Albany, N. Y. The following essayists will present papers on subjects to be announced: G. V. I. Brown, M.D., D.D.S., Wisconsin; E. S. Talbot, M.D., D.D.S., Chicago, Ill.; W. E. Griswold, M.D., D.D.S., Denver, Col.; W. A. Purrington, LL.D., New York; H. D. Hatch, D.D.S., New York; A. R. Cooke, D.D.S., Syracuse, N. Y.

Members of the profession are cordially invited to be present. Headquarters, Hotel Ten Eyck. Special rates \$3.50 per day.

JOHN I. HART, *President*,
W. A. WHITE, *Secretary*.

MASSACHUSETTS BOARD OF REGISTRATION IN DENTISTRY.

A MEETING of the Massachusetts Board of Registration in Dentistry, for the examination of candidates, will be held in Boston, Mass., March 27, 28, and 29.

Candidates who have applied for examination will report to the secretary, Wednesday, March 27, at 9.30 A.M., at Tufts College Dental School, 563 Tremont street, and come prepared with rubber dam, gold, and instruments, to demonstrate their skill in operative dentistry. Any one who wishes may bring his patient. As far as possible patients will be furnished. The board in every instance selects the cavity to be filled.

The theoretic examination—written—will include operative dentistry, prosthetic dentistry, crown- and bridge-work, orthodontia, anatomy, histology, surgery, pathology, materia medica, therapeutics, physiology, bacteriology, anesthesia, chemistry, and metallurgy, and will be held at Civil Service Rooms, State House, from Thursday, March 28, at 9.30 A.M., until Friday P.M., March 29.

All applications, together with the fee of twenty dollars, must be filed

with the secretary of the board on or before March 20, as no application for this meeting will be received after that date.

Application blanks may be obtained from the secretary.

Candidates who have taken an examination, and failed, who desire to come before the board again at this meeting are not required to fill out a second application blank, but must notify the secretary as above in order to be registered. The fee for third and subsequent examinations is five dollars.

G. E. MITCHELL, D.D.S., *Secretary*,
25 Merrimack street, Haverhill, Mass.

PENNSYLVANIA BOARD OF DENTAL EXAMINERS.

THE Board of Dental Examiners of Pennsylvania will conduct examinations simultaneously in Philadelphia and Pittsburg May 7, 8, 9, and 10, 1901. Apply to Hon. James W. Latta, secretary of the Dental Council, Harrisburg, Pa., for papers and information.

G. W. KLUMP, *Secretary*,
Williamsport, Pa.

FIFTH DISTRICT DENTAL SOCIETY OF THE STATE OF NEW YORK.

COMPLIMENTARY DINNER TO DR. S. B. PALMER.

THIS society will tender a complimentary dinner to Dr. S. B. Palmer, of Syracuse, N. Y., in honor of his long years of faithful service, both in his office and in behalf of the profession at large. Representative members of the dental fraternity will be present, and the affair promises to be most enjoyable. The dinner is to be given at Syracuse on the evening of April 13, 1901, and an invitation is extended to the profession to be present.

Dinner tickets will be issued before April 1 on receipt of five dollars. Address the chairman of the committee in charge, Dr. G. B. Beach, 518 S. A. and K. Building, Syracuse, N. Y.

G. B. BEACH,
A. RETTER,
SHERIDAN SLOCUM,
G. H. BUTLER,
J. C. CURTIS, *Committee*.

NATIONAL DENTAL ASSOCIATION, SOUTHERN BRANCH.

THERE is a rumor in the air to the effect that an effort is to be made to hold the next annual meeting of the Southern Branch of the National Association at Hot Springs, Va., in July. As the members of the Branch may be called upon, individually, to express an opinion on this question, the following points should be borne in mind:

First, as to time. The National Association will hold its next meeting in August, as usual, and in the far West. If the meeting of the Branch is held in July, comparatively few Southern members of the National Association being able to afford the time to attend two meetings so far apart geographically as Milwaukee, Wis., and Hot Springs, Va., and yet so near together in point of time as July and August, a choice will become necessary, and to Southern men the Southern Branch will naturally appeal most strongly.

On the other hand, if the meeting of the Branch is held in early spring, as has been the rule heretofore, Southern men being ready for a summer vacation in August, Milwaukee, with the meeting of the National Association, will present strong claims,—provided, however, that the meeting of the Branch shall have been held at such a central point as to have minimized spring expenses of both time and money. This claim cannot be made for Hot Springs, Va. It is too far north and too far east for either convenience of access or climatic adaptation to a meeting of the Southern Branch, which should be held at a date which will not antagonize the meeting of the National Association, and in a locality most accessible to the greatest number of its members.

The American Dental Association and the Southern Dental Association were both sectional bodies, and to a certain extent, rivals. While a few large-minded men were members of both associations, and equally loyal to both, this was not true of the rank and file in either body. But that is all done away with now. We have one great National Association, with constitutional provision for three branches—the Eastern, the Western, and the Southern. The members of the defunct Southern Dental Association, acting in good faith and loyal to the new constitution, promptly resolved themselves into the Southern Branch, and the eminently successful meetings, held in St. Augustine, Fla., in 1898, and in New Orleans in 1899, attest the wisdom of the originators of the “branch” feature.

The branches, however, were designed to be aids and feeders to the National body, not antagonists; therefore the time of meeting of a branch should be so fixed as not to interfere with the meeting of the main body, for which reason the meetings of the Southern Branch have heretofore been held in February, and the place been selected with an eye to climatic conditions. Therefore let us not invite friction by selecting a time for our next meeting which would conflict with that of the National body; and furthermore, let us not invite failure by selecting a remote place, inaccessible and inconvenient to the majority of our members. Loyal to the National, and loyal to our traditions, whenever and wherever held, let all Southern men who can, attend both the National and the Branch meetings, and so prove to the former the value of the latter.

If, on the other hand, the time should ever come—which God forbid—for justifying the hope expressed in a recent editorial utterance, that “in the not distant future Southern men will themselves offer an amendment to the constitution abrogating the branches,”—if there is to be a funeral,—let the interment be in the heart of our Southern land.

WM. ERNEST WALKER.

WEST VIRGINIA BOARD OF DENTAL EXAMINERS.

THE West Virginia State Board of Dental Examiners will meet at Wheeling, W. Va., May 1, 2, and 3, 1901, for the examination of candidates. The examination will be in writing, and will cover all the branches taught in representative schools, together with operations in the mouth. Applicants for examination are requested to furnish their own instruments and materials. Previous examination questions will not be furnished.

W. E. MINGHINI, *Secretary*,
Martinsburg, W. Va.

EDITORIAL.

THE ARMY DENTAL EXAMINING BOARD.

THE examining board for the selection of a corps of dental surgeons created by the new army law, which was approved by the President February 2, 1901, has been created by the appointment of John Sayre Marshall, D.D.S., M.D., Chicago; R. T. Oliver, D.D.S., Indianapolis, Ind., and R. W. Morgan, D.D.S., Lynchburg, Va. The Surgeon-General organized the board, and work was begun at 1 P.M. on February 18, 1901, at 1814 "G" street, N. W., Washington, D. C.

The members of the dental profession are perhaps generally aware of the efforts which have culminated in the legislation creating a dental corps in connection with the United States army service. It is difficult at this time to state with precision just when the initial steps were taken, or at whose suggestion. The general question is one which has aroused the interest of all who realized the importance of the hygienic advance which the creation of a corps of dental surgeons in connection with the army service involved, and the movement toward securing dental service for those engaged in the military service of the United States has been slowly but surely pushed forward to a successful culmination. The representations of the value of proper dental care for our soldiers which have been made in justification of the movement have had their effect upon our lawmakers, and we are now in proper position to practically demonstrate the correctness of our contention that such dental service was needed as a means for conserving the health and efficiency of our soldiers.

The opportunity thus afforded, like all other great opportunities, carries with it a corresponding responsibility, and the responsibility in this particular case is a far-reaching one. The newly-elected dental corps, as pioneers in their field, will be expected to not only render efficient service, but by the fruits of their labors demonstrate to a large and not uncritical body of observers the rightfulness of the claims of dentistry to a national recognition of its importance in this new relation. The *personnel* of the newly-appointed examining board, with Dr. Marshall as its president, we believe to be a sufficient guarantee that the selection of appointees will be conducted upon a plane which will secure the very best grade of service. We believe further that these gentlemen are fully impressed with the responsibilities which their high position imposes. And, further, that they appreciate the kind of result which their colleagues expect their work to exhibit.

The matter of selecting a board of examiners has not been without its difficulties and disappointments. All who were cognizant of the unselfish and the laborious efforts put forth by Dr. Wms. Donnally to effect the necessary legislation will be disappointed that, for reasons which seemed best to the Secretary of War, his appointment as one of the examining board was not confirmed; but, even though failing of the reward which his colleagues would have been pleased to have him attain, he has at least earned that which under the circumstances must mean to him a source of unlimited gratification,—namely, their respect and gratitude for the great work which was largely brought to a successful conclusion through his individual efforts.

EXCESS OF MATTER.

THE unusual demands upon our space have compelled us to lay over until later issues a large amount of matter already in type, including essays, reports of societies, obituaries, book reviews, and editorial matter, notwithstanding that the present issue contains thirty-two pages more than the normal amount of reading matter.

OBITUARY.

DR. CORNELIUS SEARLE HURLBUT.

DIED, January 6, 1901, of pneumonia, at his residence, Springfield, Mass., in his sixty-ninth year.

Dr. Hurlbut was born in West Springfield, Mass., March 18, 1832. He was educated in the schools of his native town, and at the age of eighteen began teaching, which he continued for two years. At twenty-one he took up the study of dentistry, with Dr. G. H. White, of Springfield, as his preceptor. He entered the Baltimore College of Dental Surgery, and graduated from that institution February 25, 1858. Returning to Springfield, he bought the practice of his preceptor and began the practice of his profession. He was for ten years a member of the board of visitors of his alma mater and was at one time president of the Connecticut Valley Dental Society, and at the time of his death a member of the Valley District and Massachusetts Dental Societies.

Dr. Hurlbut was always actively interested in dental education, and many students sought the benefit of his instruction. Not less than thirty young dentists were trained under his tutelage, eight of his students having established themselves in practice in Springfield. His professional life of nearly half a century covered the period of the most rapid development of dentistry, and his activities both as a practitioner and as an educator have aided greatly in raising the standards of dental acquirement, not only in his own locality but throughout New England. His professional work brought him remuneration as well as honor, and his accumulations enabled him to carry to successful completion a number of important real estate operations in his

native city. He was distinctly a man of affairs, having served as a member of the Common Council, during which time he did signal service by his instrumentality in obtaining better sanitary conditions. He also served efficiently for nine consecutive years as a member of the Board of Education.

He was married to Mary Waite Allis, in Hatfield, Mass., on October 20, 1858. Of this union, six children were born,—four daughters and two sons.

DR. HENRY GERHART.

WE have received information of the death of Dr. Henry Gerhart, of Lewisburg, Pa. Owing to press of matter an obituary notice of our eminent *confrère* has been crowded out of our columns this month, and will be given in the next issue of the DENTAL COSMOS.

DENTAL LEGISLATION.

NEW ARMY LAW AUTHORIZING APPOINTMENT OF DENTAL SURGEONS.

THE following is a part of Section 18 of the new Army law, approved February 2, 1901, known as "Public—No. 30," of which copies can be obtained on application to chief clerk, State Department, Washington, D. C.:

That the Surgeon-General of the Army, with the approval of the Secretary of War, be, and he is hereby, authorized to employ and appoint dental surgeons to serve the officers and enlisted men of the Regular and Volunteer Army in the proportion of one dental surgeon to every one thousand of said Army, and not exceeding thirty in all. Said dental surgeons shall be employed as contract dental surgeons, under the terms and conditions applicable to army contract surgeons, and shall be graduates of standard medical or dental colleges, trained in the several branches of dentistry, of good moral and professional character, and shall pass a satisfactory professional examination: *Provided*, That three of the number of dental surgeons to be employed shall be first appointed by the Surgeon-General, with the approval of the Secretary of War, with reference to their fitness for assignment, under the direction of the Surgeon-General, to the special service of conducting the examinations and supervising the operations of the others, and for such special service an extra compensation of sixty dollars a month shall be allowed: *Provided further*, That dental college graduates now employed in the Hospital Corps, who have been detailed for a period of not less than twelve months to render dental service to the Army and who are shown by the reports of their superior officers to have rendered such service satisfactorily, may be appointed contract dental surgeons without examination.

LIST OF UNITED STATES PATENTS PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING JANUARY, 1901.

- Jan. 1.—No. 664,830, to JAS. W. BRYAN. Dental articulator.
 " " —No. 664,857, to GEO. B. HAYCOCK. Fountain cuspidor.
 " 8.—No. 665,571, to CHAS. O. METZLER. Saliva ejector.
 " " —No. 665,698, to WILLIE F. SLACK. Dental plugger.
 " 15.—No. 666,143, to AUGUST P. JOHNSON. Dental bridge-work.
 " 29.—No. 666,691, to OSCAR H. and ALPHONSE F. PIEPER. Electric motor.
 " " —No. 666,718, to HENRY E. WEBER. Fountain spittoon.
 " " —No. 666,903, to ROBERT M. MAYES. Dental clamp.

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler. A star (*) indicates a thesis.

Maurizot (A.) [1874-] * Contribution à l'étude des fractures du maxillaire supérieur. Lyon, 1900. A. Strock & Co., 86 pp. 8°.

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THE
DENTAL COSMOS.

VOL. XLIII.

PHILADELPHIA, APRIL, 1901.

No. 4.

ORIGINAL COMMUNICATIONS.

SURGICAL TREATMENT OF PALATAL DEFECTS.

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(Read before the Third International Dental Congress, Paris, August 8, 1900.)

It is to the credit of the dental profession that the first operation for the closure of cleft palate, according to the history of this surgical procedure, was proposed in 1764 by a dentist. Inseparably associated with staphylorrhaphy is the name of the dentist La Monier, the Frenchman who first believed that this most conspicuous and distressing deformity was amenable to successful surgical treatment.

Fifty-five years after La Monier proposed to close the palate by surgical methods, Roux, of Paris, in 1819, was the first to methodize and publish rules to be observed in the performance of these operations. To our profession, then, is due the honor of the suggestion of the operation, and to France in particular, through the efforts of Roux, for successfully carrying it out. In 1820, Warren, of Boston, U. S. A., without a knowledge of Roux's work, brought before the profession a similar but somewhat modified operation, which was favorably received and adopted by many leading surgeons throughout the world. During a period of about twenty-five years this operation was performed by such distinguished surgeons as Graefe, Sédillot, Dieffenbach, Liston, and Pollock, of Europe, and the younger Warren, Wells, Mattauer, Stevens, Gibson, Hosack, Mutter, and Pancoast, of America.

In 1844, Sir William Fergusson, of London, devised a new operation. He recognized that the tension on the sutures was followed by their cutting out and the consequent failure of the tissues of the opposite sides to unite. To relieve this tension Fergusson resorted to myotomy, dividing the levator palati, the palato-glossi, and palato-pharyngei muscles. It was found that Fergusson's operation was not so frequently followed by the sutures cutting out, and consequently it became popular. Sixteen years later, in 1860, Dr. Agnew, of Philadelphia, pointed out that the action of the tensor palati muscles drew the newly approximated surfaces of the soft palate apart, causing the sutures to cut out, with failure of the operation. To relieve this tension Dr. Agnew divided these muscles at their constricted parts, as they passed over the hamular process of the sphenoid bone, thus relaxing the tension upon the soft palate and causing the sutures to less frequently cut out.

While the efforts of the distinguished surgeons named have made it possible to avoid many of the failures resulting from the sutures cutting out and the edges of the segments separating, the methods here described, which are by no means theoretical, but are based upon clinical experience extending over a period of twenty-five years, make myotomy nearly always unnecessary. The formation of cicatrices following incisions renders the soft palate thick and unyielding, so that its function is performed imperfectly. It matters not to what extent the surgeon divides, by incisions, the hard palate in closing the cleft, as its function is not to retract and vibrate, but to serve as an immovable arch, as a factor in articulation; hence cicatricial tissue here does not in any way disturb function. The soft palate must not be made stiff, thick, and clumsy by the forming of scar tissue in considerable quantities in its substance. In addition to this objection, the tensor palati muscle once completely divided at the hamular process of the sphenoid bone never unites, as the segments of the muscles immediately retract and separate so widely as to prevent subsequent union.

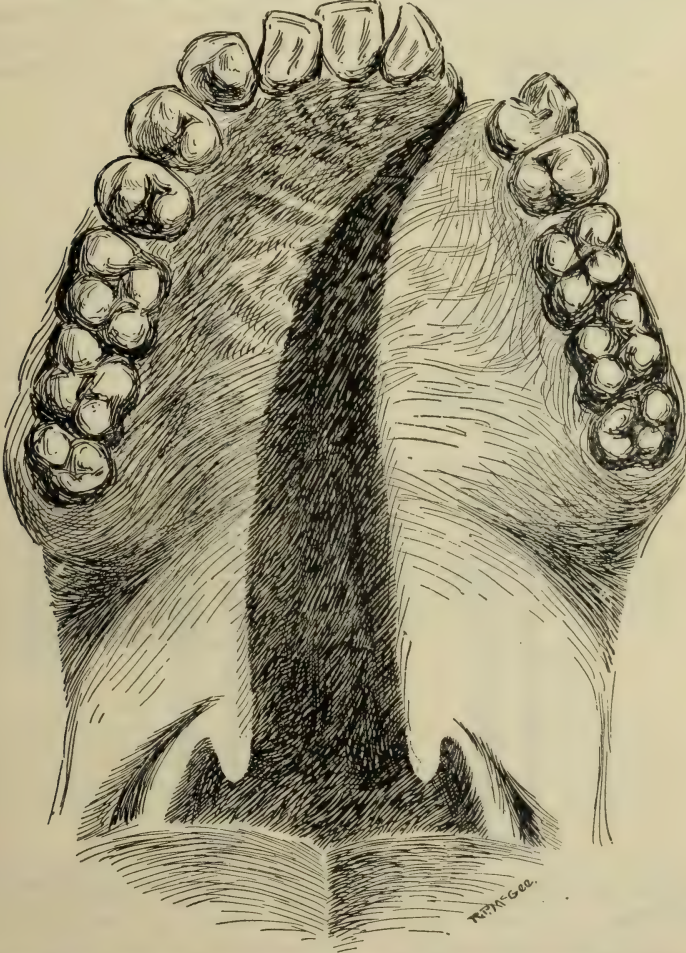
The tensor palati muscle arises from the scaphoid fossa of the sphenoid bone and the cartilaginous portion of the Eustachian tube. It is directed downward, then reflected over the hamular process, and passes forward to be inserted into the anterior surface of the soft palate. Its action is to render the soft palate tense and to dilate the Eustachian tube. It must have been observed by all operators of considerable experience that when the tension of the palate is relieved by dividing the tensor palati muscles, defective hearing frequently follows. This is due to the destruction of the continuity of the tensor palati muscles, and consequent failure of the pharyngeal opening of the Eustachian tube to dilate normally.

A statement appears in the late Professor Garretson's work which is in accord with the views of most authors on the subject under consideration: "In looking over the history of staphylorrhaphy the reader will be struck with the likeness in complaints, the three principal of which seem to be the difficulties in tying the sutures, their great tendency to cut out after they are once nicely secured, and the concealment of the parts during the operation,

both because of deficiency in light and the accumulation of the viscid muco-saliva, which in mouths thus affected is secreted in great abundance." Further, he states, "As generally practiced it is rather difficult of performance, and so frequently unsuccessful that surgeons seem disposed to avoid the responsibility of it."

The difficulties attending the closure of the soft palate may be,

FIG. I.



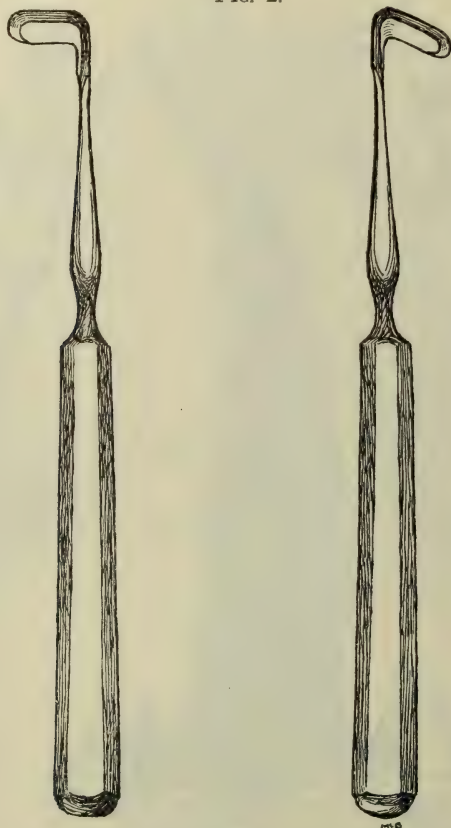
Palatal surface of adult's mouth, showing congenital cleft of the hard and soft palates.

to a very great extent, overcome by making use of the method which I here illustrate, and which is adapted to the treatment of patients whose bones are well ossified and whose deciduous teeth are erupted. The method of operating on children under six months of age will be described. Delicacy of the tissues and the tendency of the sutures to cut out suggested that a modification of the quill suture, long ago introduced, would aid us materially in

preventing the cutting out of the sutures after performing the operation of staphylorrhaphy. Inasmuch as lead is tolerated so well by the tissues, I have employed it for this purpose.

The first drawing (Fig. 1) illustrates congenital cleft palate, the fissure extending through the palatal plates of the maxillary bones. The first step to be taken in the closing of this fissure is to make use of the curved periosteotomes. (Fig. 2.) I designed these periosteotomes of different sizes and different angles so as to meet

FIG. 2.



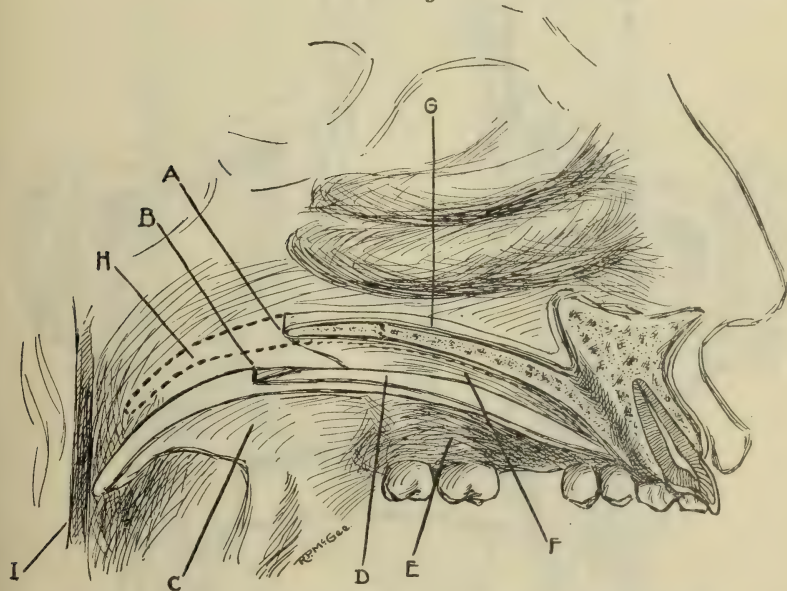
The author's curved periosteotomes used in the elevation of the soft tissue of the hard palate. There are a number of these instruments, varying from a right angle to the acute angle shown in the drawing.

the requirements of individual cases. Divide the mucous membrane at the border of the cleft and elevate all the soft parts from the hard palate, including the periosteum. (Fig. 3.)

Having thus denuded the hard palate of the periosteum, the next step will be to pare the edges of the cleft throughout the entire length of the soft palate, as well as of the soft parts removed from the hard palate, dividing also the membranes at the distal surface of the horizontal plates of the palate bones. These membranes cover also the nasal surface of the palate bones, and extend down to

form the superior distal surface of the soft palate. (See Fig. 3, A.) This done, the soft parts readily fall together, and the surgeon sees that there is *no necessity of making lateral incisions into or through the palate*; moreover, the danger of non-union just at the termination of the hard palate is very materially lessened, and the holes which we frequently find after operations in the location named are almost invariably avoided. Oftentimes the splitting of the border of the soft palate, especially in cases where this tissue is quite thick, I have found serves every purpose, as the mucous membrane divides and furnishes sufficient freshened surface of muscular tissue to enable us to get good union, and we thereby avoid the removal

FIG. 3.



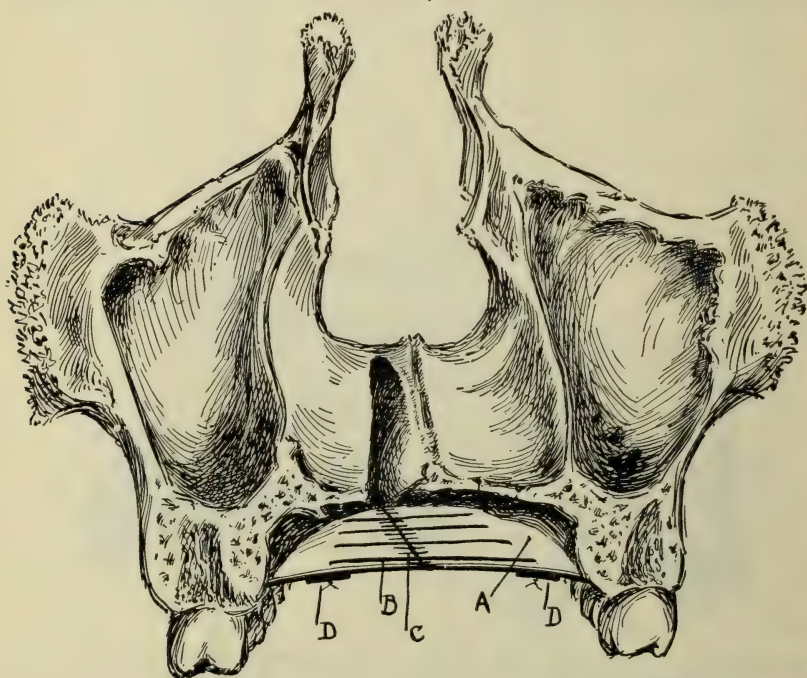
Left superior maxillary bone with associative parts, illustrating surgery of the palate. A. Posterior border of horizontal plate of left palate bone. B. Velum separated from muco-periosteum of nasal surface of palate bone. C. Velum separated from the hard palate, and the palate lengthened so as to restore palatal function. D. Periosteum denuded from hard palate. E. Palatal mucous membrane. F. Bones denuded of membrane. G. Nasal muco-periosteum. H. Position occupied by palate before operation. I. Posterior wall of the pharynx.

of any tissue whatever in this part of the palate, which is oftentimes very desirable. The height of the dental arch by this operation will be necessarily lowered to some extent. The space left between the bone and the muco-periosteal tissues in their new place will be filled with granulations (Fig. 4), and the exudate from the periosteum will produce new bone, so that we have a new hard palate formed by this operation.

After the edges of the cleft are well freshened a properly formed needle (Deschamp's, Fig. 5), curved after the fashion of the gynecologist's needle, is employed, with which to introduce silk sutures, four of which are carried through the tissues, as shown by the drawing, and these are substituted by No. 22 silver wire sutures; then the lead plates, No. 22 American gauge, are perforated with

holes corresponding to the number of sutures to be employed, shaped so as to extend from the anterior margin of the fissure back to the distal border of the soft palate, and bent to conform to its shape. The wire sutures are then passed through the holes, as shown by the drawing (Fig. 6), and twisted together. Before the lead plates are fixed in place, as a matter of convenience coaptation sutures should be introduced, but not tied until tension is exerted by means of the wire sutures, and lead plates upon the divided portions of the palate, and their edges approximated. After the edges

FIG. 4.



Vertical section of the maxillary bones of adult, looking forward from distal surface of first molar tooth. A. Muco-periosteum dissected away from the palatal surface of the superior maxillæ. B. Silver tension sutures. C. Coaptation sutures. D, D. Lead plates.

of the palate have been approximated, as shown by the drawing, the silk coaptation sutures may be tied (Fig. 7) to hold the approximated edges in close contact and thus secure immediate union.

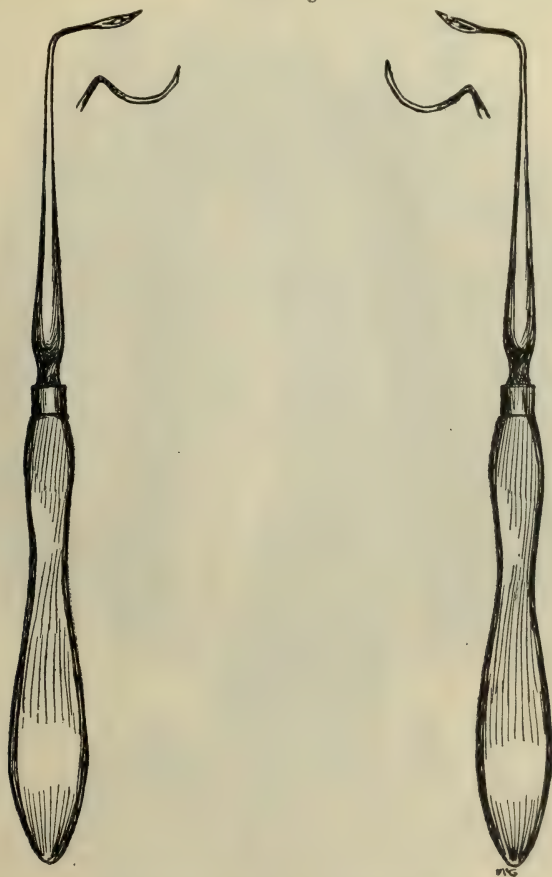
The advantages claimed for this method of procedure are—

1. The prevention of the cutting out of the sutures, since the lead plates coming in contact with the soft palate exert pressure thereon, and consequently the tension is not made by the sutures alone, which exert pressure on so limited a portion of the tissue, but it is upon the entire length of the palate covered by the lead plates.

2. The lead plates serve as a splint, rendering the palate inflexible to a very great extent. The movements which are almost constant are suspended; the active muscles are put out of use until union of the cleft may take place. After using this method of closing the

soft palate, I feel confident that better results can be secured than by the employment of sutures alone. As previously stated, this is not to take the place of the operation of dividing the bones at the malar process, and carrying the greater portion of the maxillary bones together, but it is adapted to the treatment of patients whose bones are well ossified and whose deciduous teeth are well erupted. It is in such cases that I recommend this operation.

FIG. 5.



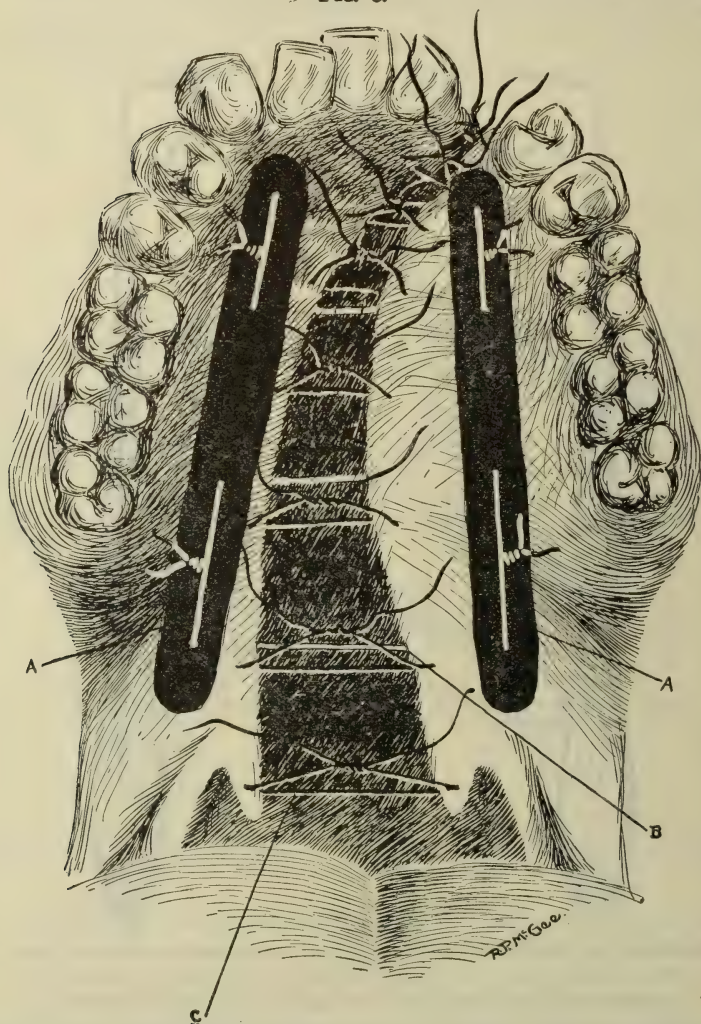
Deschamp's needles used in the introduction of tension sutures as shown in Fig. 4.

LENGTHENING THE PALATE BY SURGICAL METHODS.

In cases where the palate has not a sufficient length to perform its functions after operation, this defect may be overcome by making use of the palato-pharyngeal muscles. These muscles are usually developed far more than normally, and may be seen as broad, flattened bands of muscular tissue (Fig. 8), extending from the palate downward and outward, to be inserted into the posterior part of the thyroid cartilage. By utilizing two-thirds of each muscle and bringing them to the median line and uniting them, the palate may be lengthened to almost any extent required. (Fig. 9.)

After a careful study of normal palates I reached the conclusion, some time ago, that many of them are not long enough to close the post-pharyngeal opening during articulation, and yet in such cases speech is clear and distinct. Short palates, therefore, cannot be the sole factor in causing the nasal accent or defective speech.

FIG. 6.

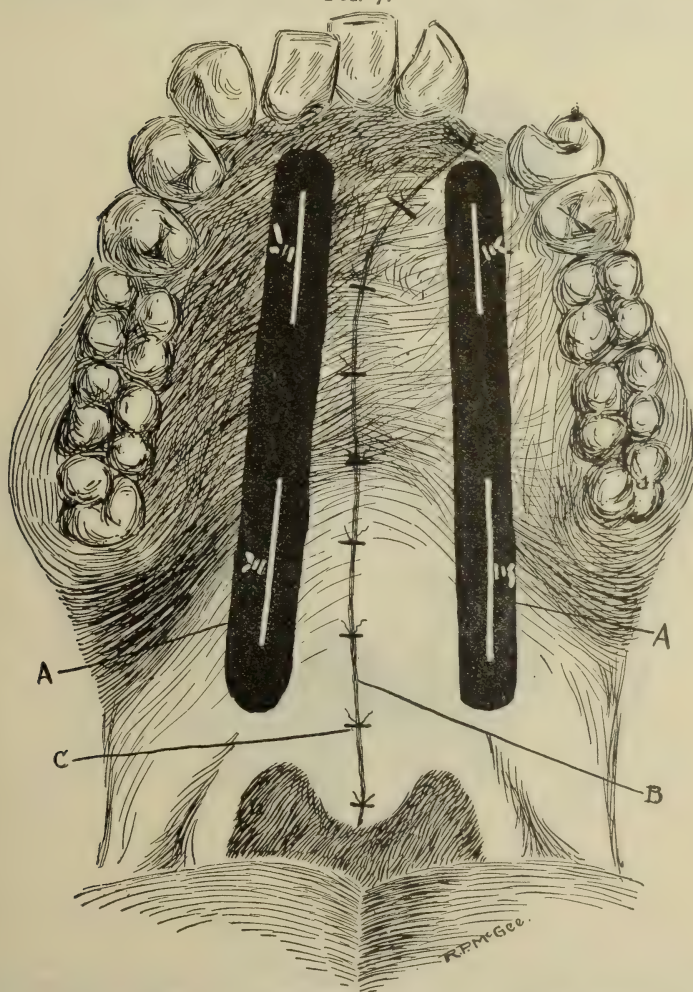


Palatal surface of adult's mouth, showing methods of closing congenital cleft palate. A, A. Lead plates. B. Silver tension sutures. C. Coaptation sutures not yet tied.

In an article on "Congenital Cleft Palate," by Dr. Kirmisson, professor of the Medical Faculty of Paris, chief surgeon of the Trousseau Hospital, and a corresponding member of the American Orthopedic Association, translated from the French into German by Dr. Karl Deutschlaender, assistant to the Royal Surgical Clinic of Greifswald, and composing a chapter of his work on "Congenital

Deformities," he enters into a description of the methods of operating, with details and technique of the surgery of the palate, in a most thorough and complete manner. On the question of the length of the palate as a factor in distinct articulation, Professor Kirmisson states: "Passavant ascribed the imperfect articulation

FIG. 7.

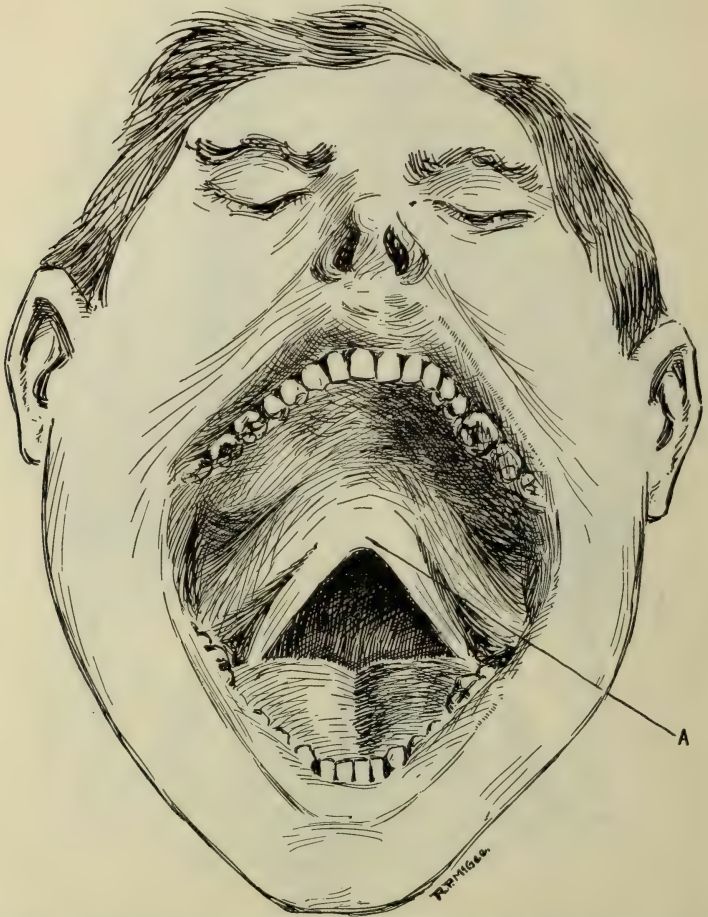


Palatal surface of adult's mouth after the tension sutures have been tightened, the muco-periosteum approximated, and the coaptation sutures tied. A, A. Lead plates. B. Closed palate. C. Coaptation sutures.

after staphylorrhaphy to the shortness of the soft palate, which could not approach the post-pharyngeal wall. J. Carl has proven this to be erroneous. He bases his statements on cases in which there has been a complete union of the soft palate with the pharyngeal wall. In these cases he also was able to observe the nasal character of the voice. Absence of proper innervation and deficient

development of the muscles have been given as causes. Trélat mentions especially the shortness of the vault and deficient development of the superior maxillary bones. This nasal character of the voice, he says, is noticed in all cases, notwithstanding the plastic operation, where the vault and soft palate are shortened, and a prosthesis cannot remedy this difficulty. Aside from the causes due to mal-development, there is another much more universal one,—namely, lack of practice.”

FIG. 8.



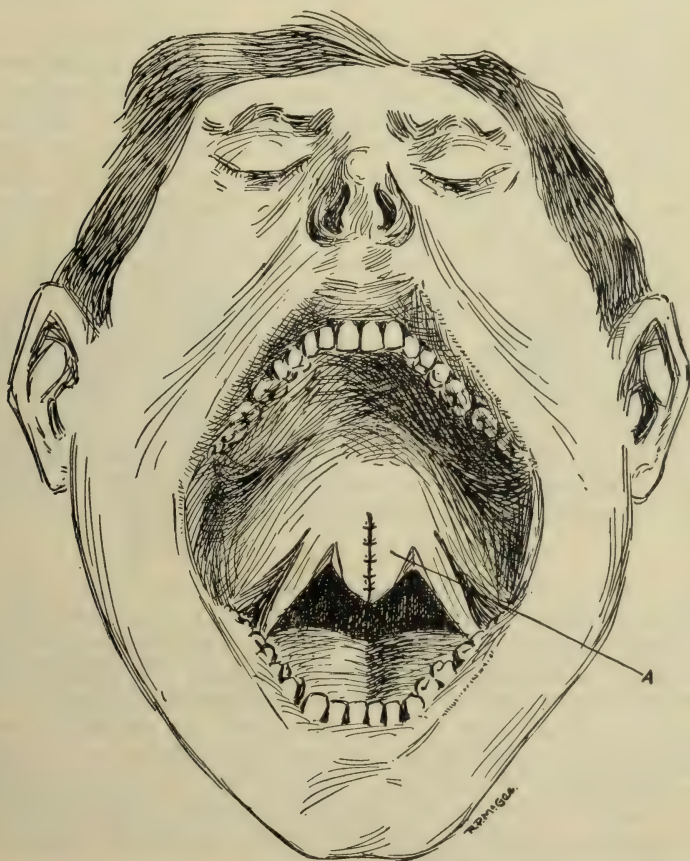
Drawing from life showing congenital defect of velum, and complete absence of azygos uvula (A).

He further says: “The surgeon should always bear in mind the most desirable age for operating. There is much discussion on this point. Before the employment of chloroform the operation was necessarily delayed until the child became old enough to understand the operator’s instructions. Thus Roux put it at sixteen years; Augenhach and Trélat operated at seven years of age. At the French Surgical Congress in 1889, Ehrmann reported his results of

early operations. He operated upon ten children under two years, with six good results, two deaths, and two failures; twenty children between the ages of two and six underwent operation, with seventeen good results, two deaths, and one failure; lastly, eleven operations between the ages of seven and ten showed ten good results, with one failure.

"These results speak against operations performed during the years of early childhood. In following each case which had under-

FIG. 9.



Drawing from life of the same case after operation for lengthening velum and making uvula by uniting in the center one-half of the over-developed palato-pharyngeal muscles (A).

gone operation at an early age we find that a large percentage die from other causes. Therefore, I believe the following to be true: Operations at a very early date seem to weaken the child's general condition to such an extent that it is unable to resist the severe diseases of childhood. Furthermore, it seems, judging from casts made from Ehrmann, as if the early operation impeded the development of the vault, and the resulting contour seems to be less satisfactory than in cases of late operations. Nevertheless, J.

Wolff, of Berlin, recommends early interference, and unhesitatingly operates on children of from one to two years old. I have not had an opportunity to see Wolff work. I must confess, however, that, notwithstanding his excellent operative technique and the employment of his tampon, operating at this early age strikes me as difficult and dangerous. The field for operation is too small,* the tissues thin, the sutures, therefore, easily cut through. Further, there exists the danger of severe hemorrhage; and, lastly, it is almost impossible to successfully follow the rules of antiseptic asepsis. Therefore I strongly recommend operating between the fifth and sixth years."

Notwithstanding the belief expressed by the celebrated French surgeon, I am convinced—after making five hundred and seventy operations for the cure of cleft palate, of which two hundred and eleven were upon children younger than six months, the others being from six months to fifty-two years of age—that *the best age to select for operating is within three months after birth*. Of the children under six months, no death occurred. Two deaths followed operations upon children three years of age, one of which I am confident resulted from failure of proper care. Of the whole number of operations, two died, as above stated.

Dr. Kirmisson states that Ehrmann operated on ten children under two years, with six good results, two deaths, and two failures, but he does not state that children within three months after birth were operated on by any of the surgeons named. After relating the results of the operations of the various surgeons quoted, Dr. Kirmisson further says: "These results speak against operations performed during the years of early childhood; besides, we find that a large percentage die from other causes."

OPERATIONS IN EARLY INFANCY.

I am but too well aware that the methods that I pursue are not generally practiced, and that they have been criticized by those who do not fully comprehend them. It is gratifying, however, to realize that many of our most distinguished surgeons who formerly questioned my method are now most enthusiastic advocates of it.

The question of early operations has with me passed the experimental stage. I will confess that my first cases were undertaken with a great deal of hesitancy. I knew that I was transgressing all the long-accepted rules of surgical procedure, but it seemed to me so reasonable that the patient should be able to undergo the necessary trial that I ventured.

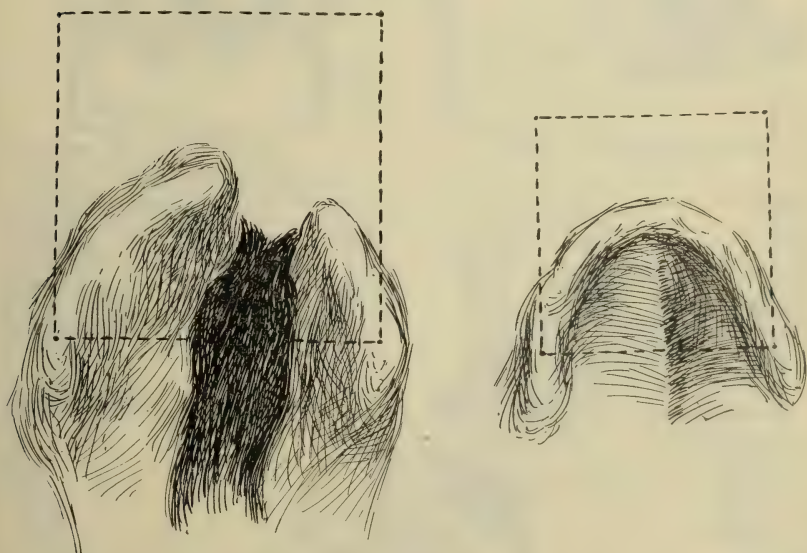
We know that the struggle of birth is often more severe than is this. There are sometimes misplacements and replacements of the cranial bones during this critical natural process, more radical than that of bringing into apposition the separate bones of the maxilla. It has been the observation of every obstetrician that injuries which the child sustained during parturition produce little immediate or ultimate injurious results.

*This statement of Professor Kirmisson is an argument in favor of postponing the operation on the lip, so as to enable us to get the benefit of extra room which the opening of the lip affords us.

My experience in operations performed for the closure of cleft palate, at from ten days to three months of age, has more and more confirmed my opinion and justified the practice. I believe in operating at as early an age as practicable after birth, usually within the first three months. My reasons are as follows, and in stating them I am, in the light of my own experience, compelled to express views quite the reverse of Professor Kirrison's:

1. The surgical shock is less because the nervous system of a young child is not well developed, and it is not, therefore, capable of receiving the same impressions that it would later in life, for young

FIG. 10.



Drawings from careful measurements of casts from life, showing relative positions of upper and lower jaws in the case of cleft palate in a young child. (The print is life size.) The dotted squares are made in exact proportion to the width of the respective alveolar processes at corresponding points. The large square is the width of the cleft greater than the smaller square. When the cleft is closed the squares will be of equal size, and consequently the teeth will occlude normally.

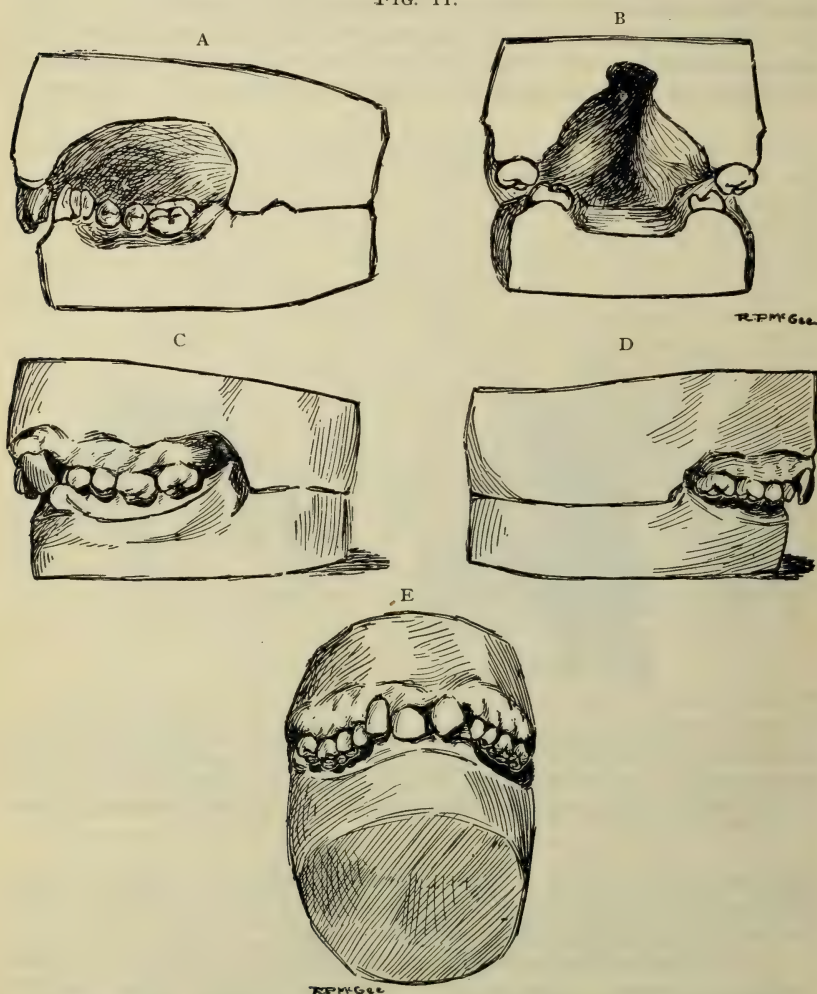
children usually react better. Moreover, all mental apprehension is eliminated,—and we all know that alarm and dread are among the most powerful factors in producing shock.

2. Before the bones are fully calcified they may be bent or moved without fracture. Bone at birth is about one-half organic matter, hence the injury is really less in closing a cleft than it would be if the calcification were more complete.

3. If the muscles are very early brought into action, they develop instead of atrophy, and hence a good velum is secured, with plenty of tissue; whereas, if the operation is undertaken later in life, after the parts are shrunk through non-use, they can rarely be made to subserve the same purpose that organs which develop through natural employment can be made to do. It is well known that muscular tissue is more perfectly developed through action. In in-

stances of cleft palate, none of the muscles of the velum can be normally employed when the parts are not united, and hence they remain in an immature condition through life, even when an artificial substitute is inserted. By operating at a very early age they are at once brought into use, and their development is proportioned to that of other tissues.

FIG. II.



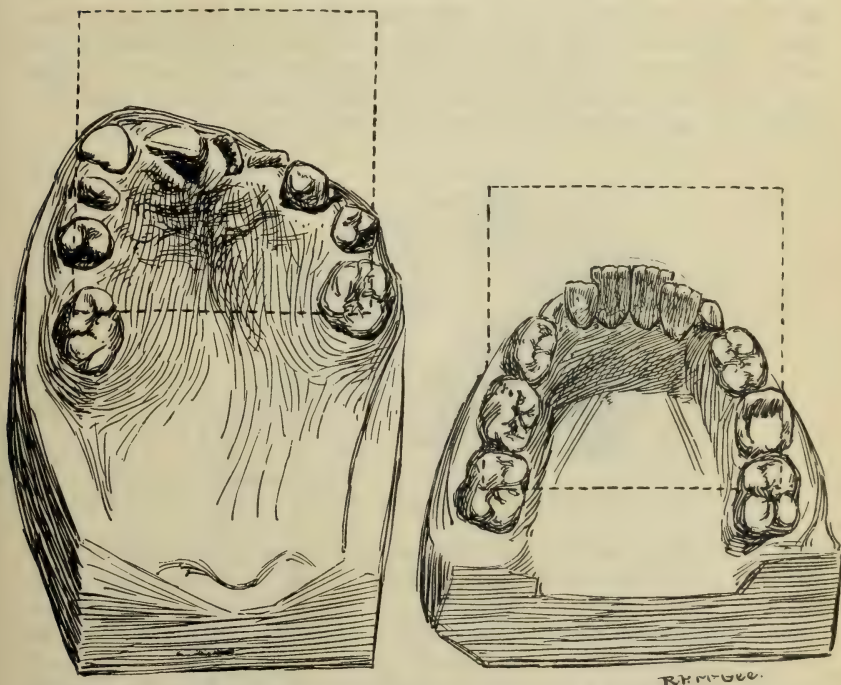
A and B. Sectional drawings of the mouth of a boy thirteen years of age, showing the overbite. C, D, and E. Different views of the same mouth, showing the overbite of all the superior teeth when the models are articulated.

4. When the palatal processes of the maxillæ are united, it will be observed that the development of the bones of the alveolar processes of the upper jaw assumes a form nearly or quite normal, and, when the teeth are erupted, they will properly occlude with the lower ones or nearly so. In my first case the breadth of the jaw was reduced about three-fourths of an inch.

It was predicted by my surgical friends that the upper jaw would be much narrower than the lower one, and that it must always remain contracted; besides, when the teeth in the upper jaw were erupted they would be considerably within the arch of the lower ones. My answer was, that later on probably it might be within the province of dentistry to correct that by orthodontial methods. It must have been observed by every painstaking student of this deformity that in nearly all cases there is sufficient tissue in both hard and soft palates, but the parts are not united. (Fig. 10.)

This failure of union causes the superior maxillary bones to

FIG. 12.



Drawings from careful measurements from casts of the upper and lower dentures of the child shown in Fig. 23. The dotted squares represent the occlusion at the present time. The superior teeth will be regulated by orthodontial methods when the age of the child permits. The child is now eleven years of age.

spread farther and farther apart, until the arch is widened far beyond the width of the lower jaw. (Fig. 11.) Had this cleft been closed in early infancy, the occlusion of the teeth, I believe, would have been normal.

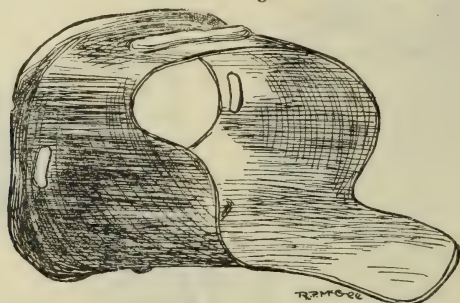
The method here described enables us to restore in early infancy the normal relations of the superior maxilla, and consequently the proper relation of the upper to the lower maxillary bones. In patients not having sufficient bony tissue to enable me to close the cleft by this operation without contracting the arch, I found, rather to my surprise, that as time went on the bones developed and the arch spread until, when the upper teeth were erupted, they occupied

nearly or quite the normal relation to the lower ones. The casts here exhibited show the development of the arch. (Fig. 12.)

5. Following early operations there is much less deformity, for all the tissues, bony as well as soft, develop naturally and according to accepted types. When the operation is postponed for a few years, it is very difficult to secure such results.

6. When the operation is made in early infancy, the parts are sufficiently advanced to give possibility for normal speech when the time comes for learning to articulate. If the operation is not made until faulty habits are acquired, it is with difficulty that they can be overcome, even supposing the muscular parts could be made sufficient. The methods of procedure in operating for the closure of the cleft are as follows: The patient should be properly prepared; the mouth thoroughly irrigated with antiseptic solutions; the patient placed on the operating table with the face toward the light, and after administering chloroform introduce the oral speculum (Fig. 13), and thoroughly remove the edges of the fissure.

FIG. 13.



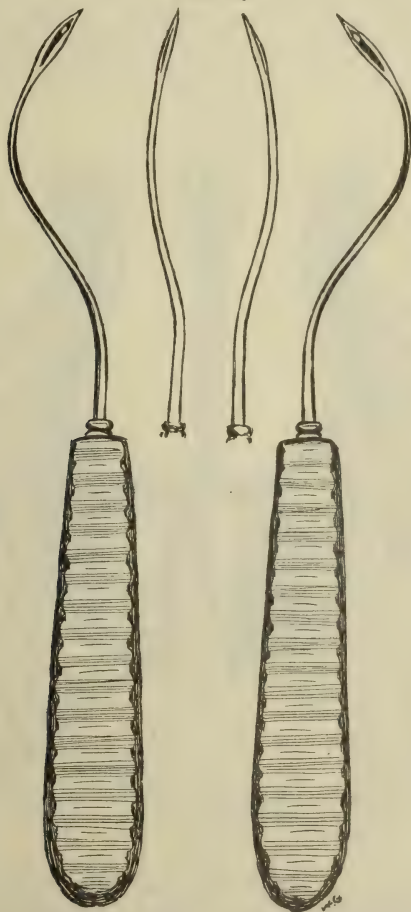
Oral speculum used in operating upon children. There are several sizes of this form.

A mere scraping of the mucous membrane is not sufficient to enable us to bring about union which will be permanent and satisfactory. Trim the opposing edges of the bone as well; it will secure a sufficient exudate, so essential to a perfect union, to make the operation successful in this respect at least. The knife will easily cut through the soft bone of the hard palate as well as the alveolar processes of young patients. Then raise the cheek, and well back toward the posterior extremity of the hard palate, just back of the malar process and high enough to escape all danger of not being above the palate bone, insert a large braided silk suture, carrying it through the substance of the bone to the central fissure by means of one of the strong needles (Fig. 14), with the opposite needle carrying a corresponding suture through the opposite side. We then have two silk suture-loops carried to the center of the cleft, and passing one loop through the other enables us to carry the one loop through both of the maxillary bones.

The silk is more easily introduced by the needle than wire, but a silver wire should always be substituted for it and drawn through to take its place. The wire should be No. 20, and may be doubled in case the condition of the parts and the tension upon the tissues

necessary to approximate them seem to require it. Nearer the front portion of the maxilla insert another wire, carrying it through the substance of the bone above the palatal plate, and through the outer side in a position corresponding to the place of entrance. Thus we will have one wire passing over the palate in front of the malar process of the bone and another behind it. (Fig. 15.)

FIG. 14.

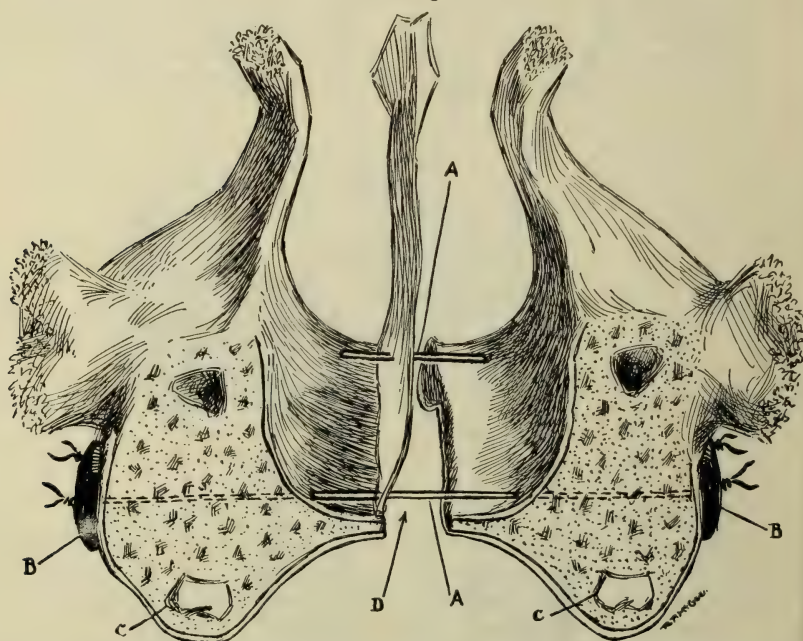


The author's strong needles used in the introduction of silver tension sutures through the maxillary bones.

The next step is to make lead plates (No. 17, American gauge) to fit the convexity of the buccal surface of the bones. Have them provided with eye-holes, through which are passed the protruded ends of the wire upon each side. Twist these together; that is, the right end of the posterior with the right end of the anterior wire, and the same on the left side. These form heavy tension sutures, and the parts when once approximated by their use cannot be separated, as *the sutures do not cut out*. If the cleft is a very wide one

and we are not able to close it by twisting the wires together upon the lead plates, force may be exerted with the thumb and fingers, or by means of a forceps designed for that purpose. If, by such force, the edges of the cleft do not approximate, there is a further step to be taken which will obviate these difficulties. After the cheek is well raised, divide the mucous membrane and the bone through the malar process. Carry the knife in a horizontal direction, and, when well inserted, sweep the handle forward and backward. In this way a maximum amount of bone and a minimum amount of mucous membrane will be divided. This done on either side, the bone can readily be moved toward the median line. The

FIG. 15.



Vertical section of the superior maxillary bones of a child five weeks of age, showing congenital cleft palate. A. A. Silver tension sutures. B. B. Lead plates. C. C. Germs of the first temporary molar teeth. D. Cleft palate.

wire sutures passing through the lead button may now be again twisted, and the cleft of the hard palate be closed by approximation of the two sides. (Fig. 16.)

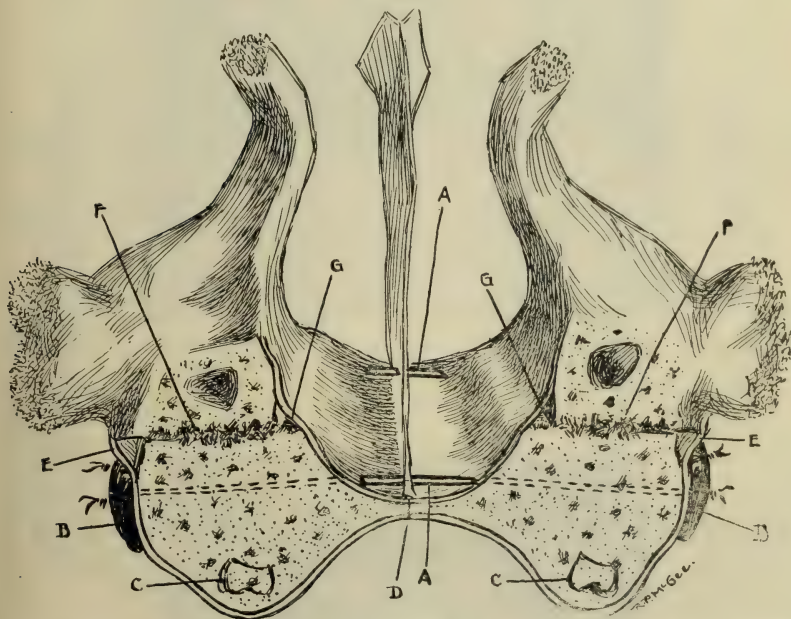
The incision of the mucous membrane must be made as small as possible, as this membrane must serve to retain the bones in proximity, or to hold them nearly together. If, after the parts are approximated, they are kept antiseptically clean, or as nearly so as possible, they will unite kindly and the palate will be formed so that its full function will be established. Separation of the bones is attended with very little hemorrhage, and the parts do not, as a rule, cause more inconvenience to the patient than the ordinary operation of lifting the hard palate according to the practice of Sir William Fer-

gusson. Should hemorrhage require attention, it is easily controlled by the application of sponges wrung out of water at about 170° F. These hot sponges, held in contact with the bleeding surfaces a very few minutes, will be all that is required.

The germs of the teeth are sometimes disturbed, and I have found occasionally certain teeth imperfectly developed when erupted.

The palatal arch is in some cases contracted, but this will not be permanent, for, if the operation is performed early enough, when development is complete the teeth of the upper jaw occlude naturally with those of the lower jaw. It is a well-known fact that the

FIG. 16.



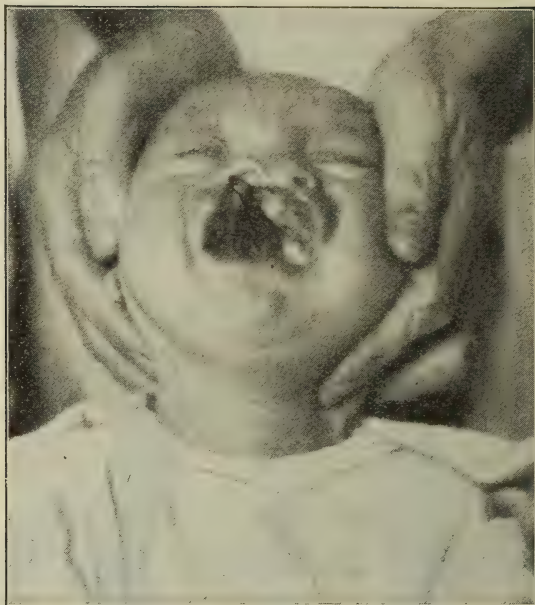
Vertical section of the superior maxillary bones of a child five weeks of age, showing method of closing cleft of hard palate. A, A. Silver tension sutures. B, B. Lead plates. C, C. Germs of first temporary molar teeth. D. Cleft closed. E, E. Muco-periosteum, forming extended wall of the triangular space by forcing the lower fragments of the bone inward. F, F. Lines of fracture made by approximation of the palatal process. G, G. Triangular space on nasal surface of bone made by approximation of the palatal process.

alveolar processes develop with the teeth, and this seems to be a pronounced factor in the formation of the jaw and the guiding of the teeth into their proper position.

After the approximation of the edges in the manner that I have described, the parts should be thoroughly dried, the edges of the cleft carefully examined, and, if need be, some fine silk sutures inserted here and there to insure the perfect coaptation of the parts. These coaptation sutures formerly used by me in the closure of the hard palate in young children are now seldom employed.

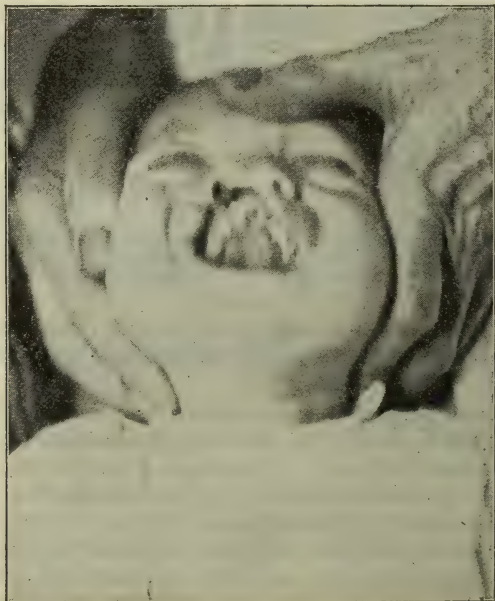
The after-treatment is very simple, consisting solely of antiseptic cleanliness of nose and mouth, at least twice a day; stimulants, if indicated, the first twenty-four hours; preventing the child from

FIG. 17.



Palatal surface of mouth of child five weeks of age, showing extensive cleft of the hard and soft palate and unilateral hare-lip.

FIG. 18.



Palatal surface of same mouth one week after the operation for closure of cleft of the hard palate.

disturbing the parts or introducing into the mouth anything that might interfere with the sutures; paying special attention to the care of the bowels; using alcohol sponge baths if the temperature rises above 100° F., and nourishing the patient on liquid food given by means of a spoon. The nipple should not be used, as the act of sucking may interfere with the process of repair. Abrasions of the mucous membrane caused by the lead plates need not disturb the operator, for they are usually slight. The plates are to be left in place from two to four weeks, but the silk sutures, if employed, should be removed about one week after the operation. Through a misconception of this surgical procedure it has been stated that

FIG. 19.

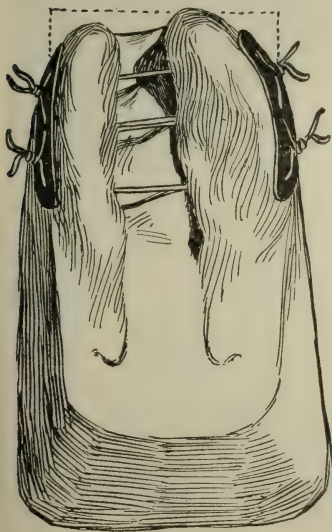


FIG. 20.



RPM:Gee

Fig. 19, Drawing of a plaster cast of the mouth of the child represented in Fig. 17, showing lead plates and wire sutures in place.

Fig. 20, Drawing of a cast of the same mouth (Fig. 18) one week after cleft was closed.

the closing of the palatal vault, carrying of the bones together and uniting them in the median line would be followed by stenosis. If one keeps in mind the anatomy of the parts, and then understands the details of the operation, he will readily see that the closure of the nasal passage or even reducing its dimensions would be impossible. (Fig. 16.)

I firmly believe that the operation should be made upon the palate before that upon the lip. It is a great mistake to commence at the oral opening and partially close the only aperture through which a subsequent palate operation must be made. The surgeon needs all the space that can be secured, which is none too much in a small child. The lip operation is comparatively simple and trivial, and it can be performed at any time; but the palate operation is made much more difficult if prior to that the lip has been closed. Should

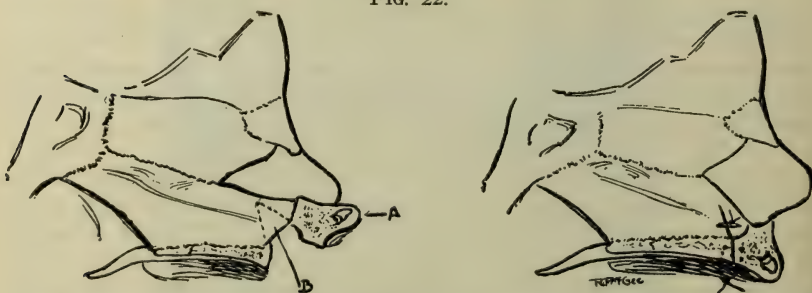
the intermaxillary bones protrude, as shown in Fig. 21, they must not be removed, but should be carried back into their normal posi-

FIG. 21.



Photograph of a child nine weeks old, having a cleft palate and bilateral hare-lip, illustrating also the protrusion of the intermaxillary bones.

FIG. 22.



Vertical section of palate nasal region of a child nine weeks of age, showing cleft palate and bilateral hare-lip and protrusion of intermaxillary bones. Protruding bones placed in their proper position and held by silver sutures. Germs of the incisors undisturbed. A. Protruding intermaxillary bones containing germs of the temporary central incisors. B. V-shaped incision in the vomer, indicated by dotted lines.

tion. This may be done by removing a V-shaped piece of bone from the vomer, as indicated in Fig. 22.

After the palate has been closed and the protruding bones have been fixed back in their proper place by silver sutures and have united, *and not until then*, the operation of closing the double hare-lip should be made. Believing that it would be of interest to the profession, I exhibited at the meeting of the National Dental Association of the United States of America, in August, 1899, several patients upon whom I had operated.

FIG. 23.



Photograph of girl who was operated on, at the age of ten days, for cleft palate and bilateral hare-lip. Cast of mouth shown in Fig. 12. Present age eleven years.

The first patient was one upon whom I operated when she was ten days old. In this case we had a double hare-lip and a wide cleft of both the hard and soft palates. The palate was closed throughout its entire length at one operation. The tissues assumed a normal relation and form. The arch is now of normal width and the occlusion of the teeth is fairly good, though not quite normal, but by employing means well known to dental practice these teeth can be forced a little farther out so as to properly occlude with the lower ones. (See Fig. 12.) The fissure of the lip extended into the nostrils; the intermaxillary bones and the central portion of the lip

were rudimentary. The lip, therefore, was formed by utilizing the tissue lateral to the fissures. An improvement in its appearance is yet to be made by removing some of the integument and reflecting the mucous membrane upward, thus shortening the lip. The child is now eleven years old, bright and healthy, and speaks perfectly. (Fig. 23.)

The next patient exhibited was a child three months old. I operated for closing the hard palate when the child was three weeks old. I exhibited a model of the parts as they were prior to the operation; it was by no means an ordinary case. The opening was unusually wide and the amount of tissue present comparatively small. On examination of the patients at the meeting named it was seen that the hard palate was completely closed, the parts being in perfect apposition and united. The opening through the lip gave good access to the parts, and the operation was performed with greater ease because of it. This little child was a brother of the girl exhibited. It is interesting to note in this connection that, of the six children born to the parents of these two, four of them were defective in this particular. The oldest one was healthy, and no evidence of the deformity existed, even to the slightest degree. The second was afflicted with double hare-lip and cleft palate; the third, with hare-lip; the fourth, with double hare-lip and cleft palate; the fifth was normal, and the sixth, with single hare-lip and cleft palate. The deformities in these children, in addition to many other cases, have confirmed my opinion that many such cases have an hereditary origin, the paternal grandfather of these children having been similarly afflicted.

In the case of a child operated upon by me June 25, 1900, I learned that the father's brother, an uncle on her mother's side, and also an uncle on her father's side had cleft palate. Although the parents had normal palates, their oldest child had hare-lip, but this palate was normal, and the second and only other child had the double deformity.

RÉSUMÉ.

1. Longitudinal incisions through the soft palate made for the purpose of relieving tension are not only unnecessary, but are injurious to the palate and its functions.
2. Lead plates fixed with silver sutures serve as splints in adults and children over six months old; besides, when this method is employed sutures do not cut out.
3. Short palates following operations or from other causes may be lengthened by surgical methods, and the voice restored.
4. The most favorable time in life for operating is between the age of two weeks and three months.
5. The rigid stiff palate following operations is due to two causes, both of which should be avoided. First, failure to lift the soft parts from the hard palate, thus lowering the vault and lengthening the palate, and, second, the making of incisions through the palate to relieve tension.
6. The parts must be thoroughly irrigated and carefully watched and cared for until union is complete.

HYPERTROPHY OF THE GUMS.

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(Read before the Pennsylvania State Dental Society, at Reading, July 5, 1900.)

THERE are two forms of this disease,—true hypertrophy of the gums, which is a very rare affection and which forms the subject of this paper, and localized hypertrophy of the gums from prolonged irritation, which is quite frequent and of little pathological or clinical interest. Up to the present time I have found only twelve cases mentioned in the literature. Each observer of this condition has attempted to throw some light upon its obscure etiology and pathology. Acting upon the suggestion that it was similar to a disease known as lampas, which is of frequent occurrence in the horse, but which is merely a congestion of the gums of the hard palate, I consulted Dr. E. J. Cornman, resident surgeon of the Veterinary Hospital, University of Pennsylvania, who very kindly reviewed veterinary literature, but was unable to find a recorded case. Dr. Pearson, dean of the Veterinary Department, says he knows of no such condition occurring in the lower animals, and, if it occurs at all, it must be as rare as it is in the human family.

The table of recorded cases given on the next page includes the two cases of my own which I report in this paper.

Of the fourteen cases, five were males and nine were females.

The condition was first noticed in eight cases during the first year, in two during the third year, one at six years, and one at nine. In thirteen cases both gums were involved, and in one the inferior right half only.

Eight were operated upon; in six the gums, teeth, and alveolar process were removed, and recurrence was noted in two cases. In one case the gums were removed and recurrence took place, and in one case the gums and teeth were removed, no recurrence following.

Two cases were associated with epilepsy and three with molluscum fibrosum.

Physical and mental conditions were normal in six cases; defective mental condition was noted in four, and defective physical condition in two.

The disease was localized in the beginning to a portion of the gums, but slowly involved the greater portion or all of the gums except in one case. It was most marked about the gingival border of the gums; it was neither painful nor tender, and seldom gave rise to hemorrhage.

The appearance of the gums was similar in all cases,—about the color of the normal mucous membrane, and irregularly lobulated, producing deformity in proportion to the extent of the development of the hypertrophy, such as bulging of cheeks and lips, or separation of the lips and jaws, or protrusion of the gums.

It was tense and inelastic, and partially or completely covered the teeth, some of which were carried out of their sockets and held by the gum-tissue, but were quite movable.

Mastication, deglutition, and speech were proportionately interfered with, but no constitutional symptoms were manifest.

Case I.—My first case was brought to me by Dr. John E. Evans, of Ohio. Mrs. L., married, aged forty years, born in Wales. She first noticed the trouble before her ninth year. Her physical and

TABLE OF RECORDED CASES OF

REPORTER AND REFERENCE.	AGE.	SEX.	BORN IN	PARENTS' NATIONALITY.	AGE FIRST NOTICED.	BOTH GUMS?
1. Gross: Syst. Surg., 2, 1862.	10	Male.	Kentucky.		9 months; probably existed at birth.	Yes.
2. Salter and Pollock: Holmes' Syst. Surg., vol. ii, p. 18.	8	Female.	England.		5 weeks.	Yes.
3. Erichsen: Heath's Injuries and Dis. of Jaws, 4th ed.	2½	Ellen S.*	England.		7 months.	Yes.
4. Waterman: Boston Med. and Surg. Jl., April 8, 1869, p. 167.	27	Female, M. A. S.			Early childhood; not congenital.	Yes.
5. MacGillivray: Australian Med. Jl., August, 1871.	29	Female.	Australia.		At or soon after birth.	Yes.
(3.) Murray: Med.-Chi. Trans., London, vol. lvi, 1871.	7	Ellen S.	England.		7 months.	Yes.
6. Murray: Med.-Chi. Trans., London, vol. lvi, 1871.	4	Rich. S.	England.		3 months.	Yes.
7. Murray: Med.-Chi. Trans., London, vol. lvi, 1871.	2	Anna S.	England.		3 months.	Yes.
8. Heath: Jl. Brit. Dent. Ass., xviii, 1897.	4½	Female.	England.	English.	2½ years.	Yes.
9. Heath: Jl. Brit. Dent. Ass., xviii, 1897.	26	Male.	England.	English.	Early childhood.	Lower right half.
10. Garretson & Cryer, Dental Cosmos, June, 1893.	15	Male.	Ohio.	Hebrews.	2 years.	Yes.
11. Roe.	40	Female.	Wales.	Welsh.	9 years.	Yes.
12. Roe.	12	Male.	Pennsylvania.	German.	6 years.	Yes.
13. Waterman, Boston Med. and Surg. Jl., April 8, 1869.	This case was exhibited by a showman in Boston, 1859, and called the intellect and remarkable hairy growth.					
14. Gross: Syst. Surg., 6, 1882.	Gross says: "A curious example of partial hypertrophy of the gums					

* This case was afterward under the care of Dr. Murray,

mental conditions were normal, except that she was slightly anemic in appearance. She had lost all of her upper teeth, and only four lower teeth remained, and she consulted Dr. Evans to know if she could be made to wear artificial teeth. The gums of the maxilla and mandible were involved; were slightly paler than the normal mucous membrane, with an irregularly elevated or lobulated appearance, and quite dense and inelastic. Those of the maxilla were thicker, and extended over the alveolar ridge and the greater por-

tion of the hard palate, varying from one-fourth to three-fourths of an inch in depth. On the mandible the hypertrophied gum extended from ramus to ramus. One incisor, a canine, and a bicuspid tooth still remained, but were lifted out of their sockets and could be moved easily in the thickened gum-tissue. The third

TRUE HYPERTROPHY OF THE GUMS.

OPERATION.	RECURRENCE.	ASSOCIATED WITH	REFERRED BY AND YEAR.	PHYSICAL AND MENTAL CONDITION.
Excis. of gums.	Yes, 4 years after.		Dr. J. N. M. Lynch, Kentucky, 1855.	Stunted development, ill-shaped head, and large abdomen.
Excis. of gums and alv. proc.	Yes.	Epilepsy, precocious dentition (6 teeth at 5 weeks).	1859.	
Excis. of gums and alv. proc.	Yes.		1867.	
Excis. of gums and alv. proc.	None.		1869.	Thick speech, deafness, and dull pain in jaws.
			1871.	Normal.
		Molluscum fibrosum.	1871.	Defective mental condition.
		Molluscum fibrosum.	1871.	Defective mental condition.
		Molluscum fibrosum.	1871.	Defective mental condition.
Excis. of gums and alv. proc.	None 7 mos. after.	Epilepsy.	1877.	General health good; very tractable.
Excis. of gums and alv. proc.	None.		1877.	
Excis. of gums and alv. proc.	None 4 mos. after.		Dr. Hisey, 1893.	
Excis. of gums and teeth.	None.		Dr. J. Evans, 1894.	Normal.
			Dr. Muehleck, 1900.	Normal.

"Bear woman." Hypertrophy was more conspicuous than in recorded cases; associated with feeble

occurring during several pregnancies has been related by Dr. J. Pitcairn."

and is the first of the three reported by him.

molar on the right side was in its normal position and firm, but almost completely covered by gum-tissue. All four teeth were free from caries. She had never suffered any pain or inconvenience from the gums other than mechanical, and there was no tendency to hemorrhage. There was some fullness and bulging of cheeks and lips. Heart, lungs, and kidneys were normal.

On March 13, 1894, I operated; Drs. Evans, Hyndman, Anderson, Wells, Proseus, and W. R. Roe were present. Ether was

administered. I removed with scissors and scalpel all the gum-tissue and most of the periosteum, together with the three loose teeth, their sockets having been obliterated, and the alveolar process was practically in the same condition as though the teeth had previously been extracted. The third molar was then extracted. The hemorrhage which was caused by general oozing was readily controlled by pressure with gauze sponges. There was no evidence of bone involvement, and I therefore did not remove any portion of it. There was practically no loss of blood after completing the operation. She was given a mouth-wash,—equal parts saturated solution boric acid and listerin,—and in about two weeks the bone was covered with a new membrane which looked normal.

During the first week in the following June Dr. Evans made and inserted a full upper and lower denture. He last saw her in June, 1895, and she was wearing her plates with perfect satisfaction, and there was then no evidence of any return of the hypertrophy. I regret exceedingly that I neglected having a photograph or impression taken of this case or making a histological or bacteriological examination of tissue removed.

Case II.—My second case applied to the Pennsylvania College of Dental Surgery, and he was referred to my surgical clinic in December, 1899. He has very kindly acquiesced to my desire to have the opportunity to exhibit to this society the very interesting condition which he presents, so that we can study it together. I deferred operation, believing that the condition progressed so slowly that I was justified in doing so. Walter K., born December 19, 1887, at Honesdale, Pa. His parents were born in Germany, and are both living; they are, and have always been, very healthy. His mother's mother is still living; his mother's father died of dropsy, aged sixty-six. Walter is the eldest of four children, the other three being perfectly healthy. Walter had whooping-cough in 1891, measles in 1892, mumps in 1893, was vaccinated and had scarlet fever in 1894. About six years ago his father noticed some thickening of the mucous membrane about the region of the lower first molar on the right side. Two years ago his father took him to a dentist, who extracted the two upper first molars, they being badly decayed. Six months later he consulted another dentist, who extracted the second inferior bicuspid on the right side. This tooth is said to have been free of caries. He undoubtedly had an attack of thrush about one and a half years ago. When I first saw the patient, in December, 1899, the gums in the molar and bicuspid regions on the right side of the mandible were greatly thickened. The two roots of the first molar were present, and there was some inflammation in the gums. I advised the extraction of the roots, and told the patient to return if the same condition of the gums continued. He returned in May, and I found the hypertrophy had increased rapidly and involved the upper and lower gums on the right side, extending to the left canine tooth, most marked in the bicuspid and molar regions. (See Figs. 1, 2, and 3.) In color the gum is of a pale pink, closely resembling the normal mucous membrane. Its thickest portion is one inch wide, extend-

FIG. 1.

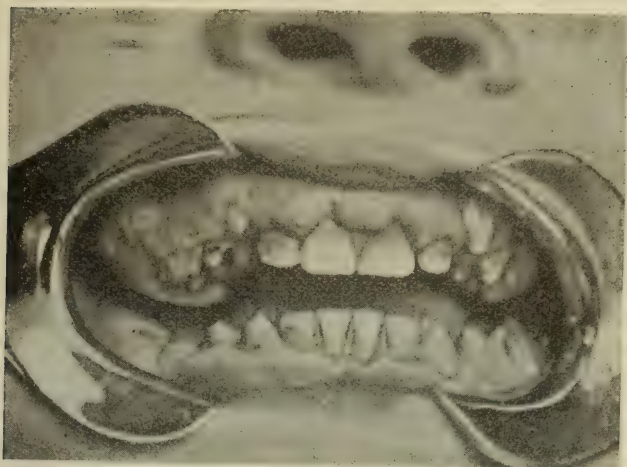


FIG. 2.

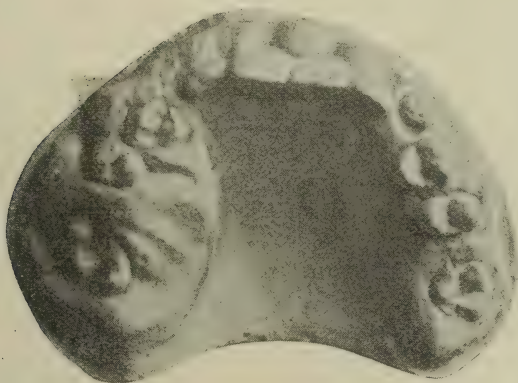


FIG. 3.



ing about equal distance upon the palatal or lingual and labial or buccal surfaces. The superior second bicuspid on the right side is carried downward and is quite movable, also the first bicuspid and second molar to a slighter extent. The gum-tissue is firm and inelastic, and has never given him pain or been tender to touch even in mastication, nor have the gums bled. His physical and mental condition is excellent. Careful examination failed to show any syphilitic or tuberculous infection in the family, with the exception of an abscess in the thigh of one of the other children two years ago, which might possibly have been tuberculous, but which healed rapidly after it was incised and drained by Dr. George A. Muehleck.

Under local anesthesia by eucain I removed a portion of gum-tissue from the palatal surface of the maxilla for examination.

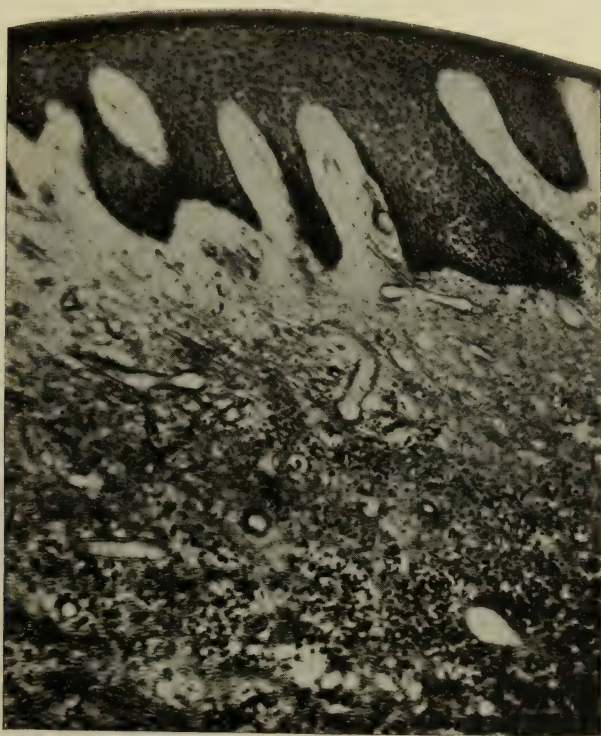
The piece of tissue taken from the gum was fixed in Heidenhain's bichlorid of mercury solution, dehydrated in alcohol, and imbedded in paraffin. Sections were made and stained with hematoxylin and eosin, hematoxylin, and picric acid, toluidin blue and eosin, and toluidin blue alone. Some sections were stained by Weigert's method for bacteria, and others for tubercle bacilli.

Histological Examination (see Fig. 4).—The sections, for convenience of description, are divided into two parts. The first part is composed of squamous epithelial cells, which cover three borders of the sections. These practically show nothing that in any way deviates from the cells which cover a normal gum. The second part (corresponding to the tunica propria) is subdivided into two layers; the first, a thin layer, is composed of a very loosely woven fibrous connective tissue. In this there are numerous small bloodvessels. The number is such that it suggests an abnormal vascularity. In this layer are found many lymphoid cells, many plasma cells, a few mast cells, a considerable number of leucocytes, and many connective-tissue cells. The lymphoid cells originate largely from the lymph glands of the body, and are abundantly present in inflammatory conditions. Although the origin of the plasma cell is not definitely known, yet in a recent paper in the *Philadelphia Medical Journal* Dr. H. F. Harris claims that v. Marschalko has advanced overwhelming proof that they are a specialized form of lymphoid cells. In the same paper Dr. Harris says that these cells are apparently not present in the normal human organism, but are present invariably during an inflammatory condition. He also says that although they begin to appear in tissue almost immediately following an injury of any kind, they do not become numerous until the condition becomes subacute or chronic and the process of repair begins. As to their function, all are agreed that they ultimately become connective-tissue cells. The mast cells occur in the connective tissue of the body, but are increased when a part is subjected to continued irritation or in certain acute inflammatory conditions. Dr. Harris has demonstrated that these cells elaborate mucin of the connective tissue. The leucocytes are present abundantly in inflamed tissue. The connective-tissue cells are present in all con-

nective tissue of the body, and probably are connected with maintaining the nutrition of this tissue.

The second, a deeper layer, which occupies the deeper parts of the sections, is composed of a much denser connective tissue than that of the first layer. Here the bloodvessels are not so abundant, but the cells are present in much greater number. The same kinds of cells are found here as in the first layer. Here and there the connective tissue incloses nests of cells which resemble carcinomatous structure. Close examination reveals that the cells inclosed

FIG. 4.



($\times 100$.)

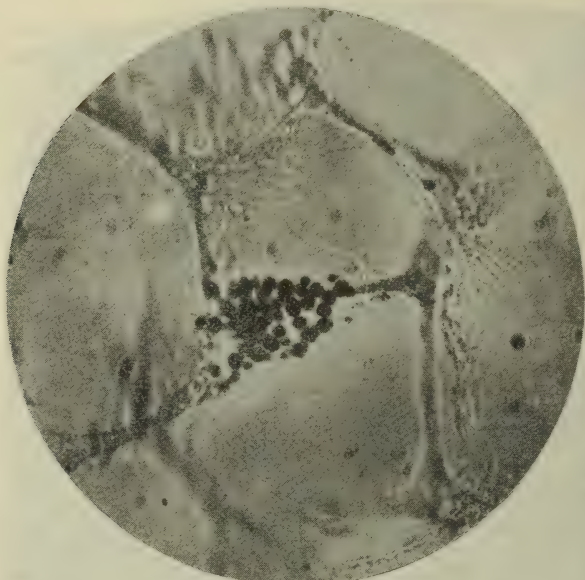
are not epithelial; thus the suspicion of cancer can be put aside. At other places there are collections of cells that resemble a lymph gland. These collections are largely composed of lymphoid cells. Scattered throughout this layer there is considerable adipose tissue, which apparently is being replaced by connective tissue, as the adipose cells appear to be encroached upon.

Bacteriological Examination.—The inoculation from the incised gum developed a whitish, scanty, granular growth, and upon microscopic examination was found, morphologically and tinctorially, to resemble the streptococcus pyogenes. No cocci were found in

the sections. No tubercle bacilli were demonstrable in the section stained for that purpose. In the sections stained by Weigert's method many yeast fungi were found (see Fig. 5).

Remarks.—In the study of this interesting condition from the recorded cases there are many questions arising, such as, What is the pathology, and what is the proper treatment? I believe that the saccharomycetes, or yeast fungus, is the cause of this condition. Dr. Gross reported the first case, and he believed it to be congenital in origin: "It first began to attract attention at the age of nine months, but there can be no doubt from its history that it had existed from birth."

FIG. 5.



($\times 800$.)

With this possible exception, in none of the recorded cases has it been shown that the affection was present at birth. In Dr. Murray's report of the three cases occurring in the same family, and which were associated with molluscum fibrosum, in his remarks upon the probable cause, he gives two possible factors: First, bad hygienic conditions, and, second, parental consanguinity, as the parents were first cousins. In both of my cases the hygienic surroundings were as good as in the majority of persons. In none of the other cases has the second factor (parental consanguinity) been present. Further, I believe that clinically Dr. Murray's cases support my own belief, and it will be shown that molluscum fibrosum is caused by some form of the yeast fungi, and that his three cases afforded unusually favorable soil for the development of the micro-organisms, although in no other cases of molluscum fibrosum reported has there been hypertrophy of the gums.

To prove beyond doubt the pathogenesis of the saccharomycetes

with hypertrophy of the gums it will be necessary to complete the circuit of Koch. The fact that the disease is so rare, and only found in the human race, almost precludes the possibility of artificially producing the disease. In the first place, it is evident that individual susceptibility is very rare; in the second place, artificial inoculation would scarcely be justifiable. If this condition were ever present in the lower animals the way would be clear to produce it artificially, as cultures could readily be taken from the gums in this case and grown in artificial media. It is highly probable that there is not sufficient fermentable saccharine fluid in the living tissue to sufficiently nourish the yeast fungi. In many portions of the alimentary canal saccharine fluids remain long enough for fermentation to occur. "In the stomach budding fungi are almost always to be found." (Ziegler.) The favorite site of the saccharomycetes is in the oral cavity.

"As disease producers the Mucorinæ and Saccharomycetes are much less important than the Schizomycetes, since only a few forms can be reproduced within the human body, and since those which do so multiply always develop only in a very limited area, the disease produced remains a purely local one. Finally, they do not produce poisons which are capable of acting upon the entire organism, or upon the nervous system, or upon the blood, but, at most, substances which act only upon the tissues in the near neighborhood of the filaments. They can therefore produce only *local infectious diseases*." (Ziegler.)

These micro-organisms may enter the organism at points which are accessible for ordinary bacteria, the changes which they produce in the tissues tending to excite a mild form of inflammation; and only in very rare instances have these organisms been noted as having been carried to other portions of the body through the lymph or blood channels. The clear history in my second case of an attack of thrush—the histological examination showing unmistakable evidence of prolonged irritation and inflammation, and the bacteriological examination showing the presence of numerous yeast fungi in the tissues—strongly points to the pathogenesis. As regards the proper treatment, it seems to me that until it is clearly proved that the alveolar process or bone is involved it is a needless sacrifice to remove any but the gum-tissue and teeth that are too loose to be retained in the process. In Salter's report of Pollock's case he said the alveolar process was extended and prolonged. In my first case there was no evidence of involvement of the bone, and, as there has been no recurrence and it is more than six years since the operation was performed, I do not intend to remove anything in this second case but the gum-tissue and periosteum and any loose teeth that cannot be retained. I will then make a further and probably more complete study of the tissues removed.*

Conclusion.—The pathology in this case indicates that this disease is not a true hypertrophy, but should be classed with the infec-

*By request, a further report of the surgical treatment, examination of tissue removed, and results of treatment, will be made at the next annual meeting of the Pennsylvania State Dental Society.

tious granulomata; and, in keeping with the established nomenclature, I would propose calling it *Saccharomycosis*, caused by saccharomycetes.

To Drs. R. C. Rosenberger and John Funk, of the Jefferson College, I wish to express my thanks. To the former, for his able assistance in the examination of the prepared specimens, having previously found the yeast fungi in quite a number of cases of sarcoma and carcinoma, and recently a pink yeast in water that proved to be pyogenic. To the latter, for his able assistance in the preparation of the specimens.

PORCELAIN INLAYS BY THE WATER-BAG METHOD.

BY I. N. BROOMELL, D.D.S., PHILADELPHIA, PA.

(Read before the Pennsylvania State Dental Society, at Reading, July 5, 1900.)

THE principles involved in this method, which, it must be understood, refers to the formation of the matrix only, are closely allied to the process of swaging with the shot apparatus, which includes in both instances a complete envelopment of the object to be swaged by the swaging force and an equalized pressure in all directions at the same time.

The term "water-bag" method does not very fully describe the process, but it does so to exactly the same extent as does the term "shot" swaging method to that process. The rubber water-bag is the essential factor in doing the work, all other parts being purely auxiliary.

The apparatus consists of four parts, a plunger, a soft rubber block or water-bag, a bed-plate, and a basal portion into which the other parts are fitted. To make use of this device the cavity is prepared in the same manner as for inlay work in general; that is, without undercuts and the margins clear cut and without bevel. Disregarding the subject of space, which is requisite in this as well as in all inlay-making when the cavity is situated approximately, you proceed to take an impression of the cavity with wax or impression composition, including in this impression as much of the surface of the tooth as it is possible to obtain, this latter detail serving as a guide for contour, fullness, etc. The concave surface of the bed-plate is next prepared for the reception and ready removal of a body of plaster of Paris. While this body of plaster is yet soft the wax plug carrying the impression of the cavity and associated tooth-surface is carefully forced into it, with the result of forming a plaster duplicate of the cavity and tooth. The work now proceeds in a manner somewhat similar to that of forming a metallic matrix in the mouth. Take a piece of gold or platinum foil somewhat larger than the cavity and trim it to a circular form. This precaution of trimming the foil to a circular form is one which profiteth much, all angular parts about the periphery of the metal sheet serving, as they do in swaging ordinary metal plates, as points of resistance and materially interfering with the ready adaptation

of the metal to the parts. The metal sheet is slightly depressed into the plaster cavity by guarded pressure from a ball of cotton or other suitable medium, keeping this up until a considerable portion of the metal is brought into contact with the bottom of the cavity, thus reducing to a minimum the possibility of tearing the foil. The rupture of the foil at the point of greatest strain is, however, not a serious complication, as it may readily be bridged over by the porcelain and no harm will result during the baking process. With the foil roughly shaped to the plaster cavity, the swaging apparatus is next used to complete the formation of the matrix. The plaster reproduction of the tooth and cavity, together with the bed-plate, are placed in position in the cylinder, and upon these are placed the rubber water-bag attached to the metal plunger. The entire apparatus is then placed on an anvil or other equally solid foundation and the swaging force applied.

The swaging force may be either the blow from a heavy swaging hammer or it may be made by some slow, gradual pressure. A novel but very effectual method of applying the swaging force is that afforded by the downward pressure of a modern operating chair, placing the swager on the circular base surrounding the piston of the chair and gradually allowing the chair to descend upon it. After the swaging is completed the plaster form is removed from the bed-plate, and it will be noted that the foil has been forced into very close contact with all parts of the plaster cavity. Without removing the matrix from the plaster, the unbaked porcelain is inserted in the usual way, and the plaster and matrix are then transferred to the furnace.

It is a common rule of technics that all new methods to be of any practical value must possess some advantages over those already in use, and I shall therefore briefly enumerate the qualifications which warrant the recognition of the system just described:

First. Adaptability. The foil is evenly and accurately swaged into and about the margins of the cavity, and, being held in this form by the plaster mold, it is unalterable.

Second. The entire surface of the foil being acted upon by an equalized pressure at one and the same time, results in a matrix free from springiness.

Third. There is no withdrawal of the matrix from the cavity, consequently no alteration in its shape.

Fourth. The work may be accomplished away from the mouth and during the patient's absence.

ARREST AND PREVENTION OF CARIES IN TEMPORARY MOLARS BY THE USE OF METALLIC CROWNS.

BY DR. CLAUDE MARTIN, LYONS, FRANCE.

(Read before the International Dental Congress at Paris, August 8, 1900.)

THE temporary molars, although their existence is only ephemeral, can be attacked by caries of any degree of intensity,

just as can the permanent teeth. There is a general tendency to neglect these lesions on the ground of the temporary character of these molars; the careful treatment to which they ought, in fact, to be submitted being considered useless from the fact that they are fated to disappear.

A similar negligence can be explained by the ignorance of people generally as to the troubles which may follow caries of the temporary molars. It is the duty of the practitioner to point out these dangers and to arrest the ravages of decay by the institution of a rational treatment.

These troubles are numerous and serious. First we have pain, which may be severe to sensitive young children. It makes them unhappy and restless, is the cause of refusal on their part to take the necessary food, and hinders them from sleeping. Then follow troubles of mastication, due to the destruction of these teeth. Under such conditions mastication is not carried on in the proper way, and very soon alterations in the gastric and intestinal functions take place. The digestive absorption is very much affected precisely at a period when assimilation is intense.

All these disturbances tend to make the child thin, and sometimes they may be the cause of a true arrest of development. This is often a temporary condition; nevertheless it may leave indelible marks upon the organism.

The articulation, too, can be modified, and if later on the eruption of the permanent teeth is irregular or late, it may be the result of deviations not only of the teeth, but also of the maxillæ, as I pointed out in a paper on prognathism of the inferior maxilla. These detrimental consequences should be made known because the number of children who present lesions of the temporary teeth is increasing constantly, and because it is inhuman and dangerous to abandon them to their sufferings.

When we come to apply to carious temporary molars the ordinary conservative methods we find numerous difficulties in our way. Our repeated trials often result in complete failure, and we have at last to extract the diseased teeth, an operation which may produce injurious consequences when performed upon teeth of the deciduous set.

Before the eruption, the dental germs can be contaminated through the blood. During the intra-uterine life the fetus suffers the consequences of the diseases of the mother, and the alterations in her blood exercise a detrimental influence. The germs of the enamel appear at about the fifteenth week; hence they can be submitted, as all the other fetal tissues are, to secondary alterations when the mother is attacked during the last six months of pregnancy with dyscrasic or infectious diseases.

The same is the case during the feeding period. If the feeding is defective it is accompanied by chronic gastro-intestinal troubles. If nutrition is bad the normal evolution of the tooth-germs may be interfered with. The difficulties of the weaning period at the moment of the transition in the kind of food may be the cause of the same bad result. In all these cases of affected nutrition,

—namely, in intra-uterine life, in the nursing period, in that after weaning,—the dental germs undergo abnormal changes; thus from the beginning their evolution is defective, their tissue deteriorates, and the teeth at the moment of their eruption appear, if not carious, at least with the enamel already strongly disorganized.

In the second case the eruption has been regular, but caries appears later on. The later lesions are often the consequence of infectious diseases which attack man at this period of life: these are enteric fevers, diphtheria, eruptive diseases, etc., whose micro-organisms or toxins have an undoubted influence on the nutrition of the tissues of the teeth and on the development of these organs.

The good results of ordinary methods of filling, when applied to carious temporary molars, are often of but short duration. No matter with what care the operation is performed, the caries sometimes becomes of the penetrating character, in spite of two or three fillings successively inserted. These facts find an explanation in the peculiar constitution of the temporary teeth. They are less dense and less resistant; the layer of dentin is thinner; the pulp-chamber is larger, and hence the exposure of the pulp is easier and the infectious germs penetrate with greater facility. Caries in such cases develop more rapidly into the penetrating type, and this notwithstanding that the filling has been applied upon healthy tissue.

In consequence of the failure of the conservative treatment generally followed in dealing with this variety of caries (treatment being undertaken generally at too late a period), I have thought of arresting the development of the carious process and of supplying mechanical reparation for the destruction of the molars by protecting them with metallic crowns. These crowns are made of gold or platinum. They cover and inclose the entire crown as far as the neck of the tooth, and remain in position in a permanent way until the physiological replacement of the tooth.

The placing of the crowns is with the object of arresting completely the progress of caries. By their exact application to the surface of the tooth they protect the organ from the air and from the corrosive action of the buccal liquids, and this isolation suffices to prevent the evolution of the lesions.

The crowns should be placed as soon as a tooth is threatened with caries; its application should not be postponed until the lesion is confirmed. At an early period we find the best possible conditions for succeeding with this treatment. But it is not always so, and often the little patients are brought to us with advanced caries. In such cases the cavity should be carefully treated and filled. It is only then that the crowns are placed. Thanks to this procedure, the result of the obturation is rendered permanent; the decay does not progress further, and the filling is protected from the buccal liquids, as well as from the shocks and the abrasion due to the masticatory process.

At the beginning I questioned if it were possible to crown teeth already badly decayed, whose crowns were entirely or partially destroyed. Experience has taught me that it is not only possible,

but also very advantageous. In fact, teeth so badly decayed cannot be of any use in mastication; yet when they are protected with a metallic crown, which rebuilds their form, they furnish to the antagonistic teeth a solid point of support, and give back to the destroyed tooth its mechanical rôle,

I cannot present for the support of this point a great number of facts. Nevertheless, the following observations I consider to be absolutely demonstrable:

The superior portion of the crown of the left first molar of a girl of five years of age was completely broken down; around the tooth there was a zone of swollen tissue filled with pus. I disinfected the cavity as well as I could, and opened at different points the swollen zone with the thermo-cautery. After a few days of thorough antiseptic treatment I placed a crown which replaced the lost portion of the tooth, and also covered the rest of the crown as far as its neck. I took the precaution to force the crown well under the gum. In this way I obtained the greatest possible solidity, and isolated the tooth from the influence of the buccal fluids. For a time the openings of the abscess were kept unobstructed by means of the thermo-cautery, and I had the satisfaction of seeing this tooth which seemed in such a damaged condition become firm in its socket. The suppuration disappeared, and the tooth was replaced in due time by its permanent substitute.

In another girl of four years I had to treat the same lesion in the same tooth. I followed the same treatment, but the pain persisted for a longer period. The openings which I made with the thermo-cautery in order to open the abscess at last exposed the posterior root of this tooth. This was natural after the alveolus had been destroyed. From that moment the pains ceased, and the tooth became relatively firm, especially when we consider that this was accomplished with only one root. At six years the tooth fell out spontaneously, but until that time the child had been able to masticate perfectly and without experiencing any annoyance.

In a very cachectic boy of five years, who only looked to be three and one-half years, all the molars were attacked with advanced caries. The anterior teeth were badly disorganized; mastication had been impossible for a long time. The molars could not support any pressure. They were black, and so few pieces of enamel could be seen at the margins that I doubted if they had ever been protected with enamel. Nevertheless, the dentin, although of a dark color, did not show any signs of softness, as is the case in dry caries. The central portion of the tooth was largely protected; the pulp was yet very painful, although partly destroyed. I undertook the treatment of the teeth of both maxillæ. After one month I succeeded in extirpating the pulp, and filled the eight cavities with cement. The canals were filled for half their length with *pulpine*, a combination of oil of cloves, zinc oxid, calcium carbonate, and tannin. As no pain was felt after fifteen days, I took the impression and made eight crowns, with the idea of protecting every molar.

Fearing that the amount of tooth-substance that remained would not afford enough support to the crowns, I united every two crowns

by means of small gold bars placed laterally, one at the internal portion and the other at the external, and soldered to the crowns at their extremities. With this arrangement I could separate them easily if the case should demand it, and in the meanwhile it gave to the crowns great solidity. The crowns remained in position nearly two years. When the lower left bicuspid began to erupt I separated the crown which covered the temporary tooth by sectioning the uniting bars by means of corundum disks. I had just cut the second bar when the crown fell out, and at its interior the *débris* of the molar could be seen. The second molar remained in position, and was very firm. At very short intervals I intervened in the same way in the right side of the lower and upper jaws, but when I wanted to separate the crowns of the upper left molars they fell out. This was due to the rotating force of the disk. I saw then that the roots of the second molar had undergone complete resorption. The crowns of the upper and lower second right molars fell out after eight months. The lower one on the left side remained in position for two months longer.

During all the treatment the child was able, owing to these crowns, to nourish himself and to properly masticate his food. And when the molars fell out the first permanent teeth had made their appearance, so that the child could continue to nourish himself properly.

The first effect of this complex intervention was the complete arresting of pain. It allowed the child to ingest solid and even hard food, and to easily nourish himself until the temporary dentition was replaced by the permanent. On the other hand, as I gave to the crowns a convenient height, and as the molars in both jaws were crowned, the bite was opened. This procedure relieved the anterior teeth, which remained separated, and the risk of their fracturing was reduced. Lastly, from an esthetic point of view, this child, who had had the appearance of an old man, regained a physiognomy appropriate to his age. After several months, through the improvement in the masticatory function, the child developed so well that he became unrecognizable as the same child. Later on the permanent dentition erupted regularly, notwithstanding the traces of erosion that could be seen upon the lower and upper incisors, which were more marked than upon the first permanent molars.

On account of the difficulties of placing crowns in certain nervous and timid children, and in order to simplify the operation, the two temporary molars could be protected by a single crown. This is done so that when the first molar comes out the second will have been protected for a long time, and will have had resisting power up to the moment when it is shed.

That, at least, was the idea that I had in the case of the first patient to whom I applied this treatment. For this child I crowned the temporary molars of the lower jaw with a single crown; this was done on both sides. After a few months I observed that the first permanent molar was erupting toward the inner side of the jaw, and entirely under the temporary tooth. To prevent this

abnormal evolution I decided to remove the common crown to the two teeth. The portion which covered the first molar was very troublesome to remove, and I had to split it on the external surface. I then removed the crown, the tooth coming out with it. As the second molar was entirely covered with cement, I thought that the placing of another crown was not necessary; then, too, the first molars were already erupted, and were sufficient for masticating purposes. Three months afterward the child was brought back suffering very severe pain. The cement had nearly disappeared, and I had to extract the tooth. Such being the case, when I had to remove the crowns of the opposite side I immediately placed a new crown upon the second molar, which remained there for eleven months and no complications were ever observed. After this time I removed the tooth with the fingers. I do not need to add that this experience was not lost upon me.

To summarize, I will describe the *modus operandi* that I have adopted, and that I recommend. I crown separately with metallic crowns the four molars of the same jaw as soon as the slightest sign of caries is observed on any one of these teeth. The operation must be done as early as possible, without waiting until pain has set in. We may be sure that teeth developed at the same time will be only equally resistant, decaying with the same facility. By this crowning method caries will be arrested. As soon as the slightest change in the enamel is observed the treatment should begin. The more delicate, nervous, and timid the child, the sooner should the treatment be instituted. It must not be forgotten that pains and troubles of nutrition put the child in a condition of diminished resistance, and render him more liable to contract the numerous infectious diseases which generally attack young children. As a simple case of caries can be in certain cases the beginning of more serious affections, it is our duty to look ahead and to prevent such disorders. If the treatment is pursued at the beginning of the disease it will be far easier, as the child at that time will not be suffering so much, is stronger, less nervous, and will bear with greater patience the small annoyances of a treatment which, performed at this stage, must be absolutely painless.

Once the crowns are in position, the child will be protected from pain. These crowns should remain in place until the teeth are shed. If one of the crowns should happen to become detached, an accident which should seldom occur, and which I have not observed as yet, it should be cemented again.

As a general rule, it is useless to crown the antagonistic molars, but at the first sign of caries there should not be a moment's hesitation as to the advisability of protecting all the other molars with crowns. I say all the molars, as I wish to insist upon the point that it is always necessary to crown all the molars of the same maxilla as soon as one demands this treatment. This is an essential point in order to prevent difficult mastication, such as would be caused by a lack of contact. The crowning of molars would open the bite, and by so doing the space between the anterior teeth of the superior and inferior maxillæ would be increased. As I have already said,

this separation presents advantages when the incisors are frail or decayed. In other cases it is not necessary to pay any attention to the widening of the space referred to, as it is lessened by the retraction of the crowned teeth or by the elongation of the anterior teeth, which for the time being do not sustain the pressure of the antagonistic teeth, and are thus permitted to grow into new occlusal relation.

Conclusions.

First. Caries of the deciduous teeth presents serious inconveniences; these are pain, modifications of the articulation and difficulty of mastication, combined with troubles of digestion and changes in the general system.

Second. Caries may be precocious, and appear from the moment of eruption. In such cases it is the consequence of defects in the nutrition of the fetus during the last period of pregnancy, or of faulty feeding of the newborn by the mother. It can also be caused by a precocious weaning, by general infection, or by eruptive fevers attacking the child at a very tender age. Caries can also appear even when the eruption has been regular. In both cases treatment is unsuccessful, because the tissues are less dense, the layer of dentin is thinner, and the pulp-chamber larger, so that the pulp is more easily exposed and infected.

Third. The crowning of the teeth alluded to with metallic crowns arrests caries. They play an isolating rôle, and protect the tooth from the action of the buccal liquids; they also have a mechanical function, as they furnish a solid support for mastication.

Fourth. The crowns must be placed on any tooth that is threatened with caries, and all the molars of the same maxilla must be equally provided with crowns to maintain good conditions of mastication. The placing of crowns opens the bite and widens the space between the anterior teeth of the superior and inferior maxilla. This is corrected by the retraction of the crowned teeth or by the elongation of the anterior teeth.

SOME VULCANITE ADJUNCTS.

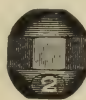
BY W. STORER HOW, D.D.S., PHILADELPHIA.

THE little soft vulcanite devices shown in Figs. 1 and 2 were originally designed by the writer as adjustable aids for the fingers when considerable force should become requisite in the use of dental

FIG. 1.



FIG. 2.



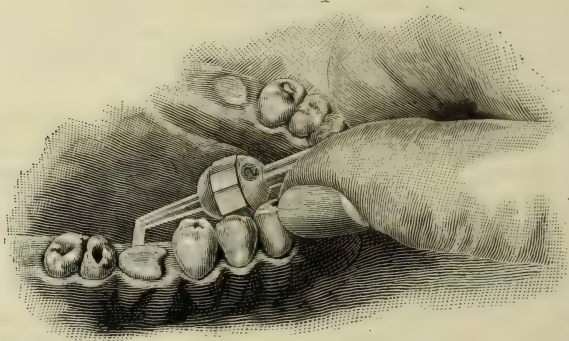
excavators and pluggers. These "finger rests" have afforded relief to fingers tired or cramped by continued contact with the comparatively small shanks of various hand instruments, but they have

further functions, to which attention may well be directed; and to that end some typical instances will here be cited, and in some degree illustrated.

In Fig. 3 is shown an adjunct on the shank of a strong-bladed excavator, with which, resting the soft elastic adjunct against the linguo-coronal margin of a molar or bicuspid, this will be pressed into service as a fulcrum, and enable the operator to employ the excavator as an elevator, having the function of a lever with which to pry up the superficially attached root shown and quickly detach it safely. This process is specially effective in the extraction of roots when it is often desirable regarding children and timid patients to avoid the exhibition of forceps, the appearance of which adds to their already excited apprehensions.

In such cases the reinforced excavator presents no fearsome object to view, and, preceded by the soothing remark that the patient will not be hurt very much, enables the dentist by the com-

FIG. 3.



bined lever and lifting movement to instantly pick out a root, thus inflicting the least possible pain. The peculiar mechanism of the movement is worthy of note, inasmuch as the prying power is great; and applied at the moment of most resistance in detaching the root from its attachment, while at the same time preventing the momentum of the release from projecting the blade of the excavator beyond the complete control of the dentist, to endanger the adjacent tissues of the patient.

In Fig. 4 an adjunct is seen in position on the shank of one of the writer's fissure chisels, and in this instance an anterior tooth-crown is utilized as a fulcrum on which the soft vulcanite is firmly pressed, and by a forcible rocking motion of the handle the chisel is made to cut the tooth enamel without any danger that the momentum of sudden release from enamel contact will carry the chisel-point onto or through the floor of the tooth-cavity. The sectional view, Fig. 5, makes quite obvious the limiting lever action which, under the complex direct downward pressure on the fulcrum cushioned by the adjunct, together with the rocking or oscillating pressure on the chisel, effects a resultant operative action on the

tooth-substance that is so progressively cut by the rocking of the handle in the firmly controlling hand that the work is quite surely, safely, and speedily done.

FIG. 4.

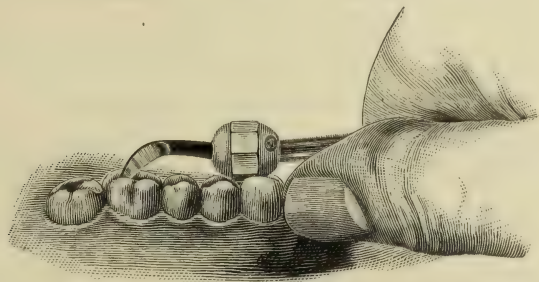
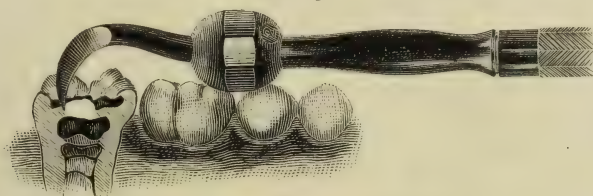


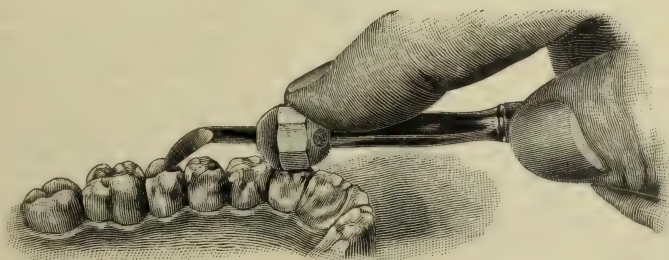
Fig. 6 illustrates the operation in a similar manner on a tooth of the left side, and teeth of the lower jaw are chosen for demonstration because positionally more adaptable for depiction than those of the upper jaw, although these are also amenable to like treatment in practice.

FIG. 5.



Many other instances in constantly recurring situations will appear in which preliminary chisel work on cavity walls of every class may be expeditiously and safely accomplished by the use of these little adjuncts.

FIG. 6.



As aids in the forceful employment of burnishers and condensers, the adjuncts will be found very useful when applied and operated in the manner suggestively indicated.

In most cases the smaller, or Fig. 2, size will be preferable for fulcrum work, and its position on the shank of the solid handle will be determinable by the incidental relations of the fulcrum to the subject teeth.

PROCEEDINGS OF SOCIETIES.

THIRD INTERNATIONAL DENTAL CONGRESS, PARIS.

(Continued from page 289.)

FOURTH DAY—SATURDAY, AUGUST 11, 1900—*Continued.*GENERAL ASSEMBLY—*Continued.*

THE president then called on Dr. ELOF FÖRBERG, of Stockholm, to read his article (of which an abstract follows) entitled

STUDY OF THE TEETH OF CHILDREN IN THE VARIOUS SCHOOLS OF SWEDEN.

Intellectual and physical education are to-day the object of the most careful attention in our schools. Everywhere it is the aim to realize that principle of ancient education which says *mens sana in corpore sano*. Sweden has taken a great part in the realization of these reforms. The organization of our schools, and the beautiful and well-furnished buildings of the common schools, are the admiration of foreigners. The Swedish *savants* have published standard works on the hygiene of schools. The Swedish method of gymnastics has a wide reputation for excellence. Country homes are provided for sick children; in fact, Sweden has done everything possible to ameliorate the sanitary conditions affecting the younger generation.

One point seems to have been neglected, and that is *the hygiene of the mouth*. The capital importance of this question has not attracted sufficient attention. Why? One of the causes lies probably in the fact that the study of the diseases of the oral cavity and of the neighboring organs has been divided between a great number of specialists, such as dentists, physicians, surgeons, laryngologists, and pediatricists, who do not determine with precision the limits of every one of these branches.

It is useless to try to prove before this assembly how much buccal hygiene is neglected as a general rule, and to once more describe the dangers of this negligence both for the individual and for his surroundings. I will limit myself to presenting a few observations on a morbid condition which is, more than any other, and especially in children, the cause of the ravages of disease in the masticatory apparatus: I mean dental caries.

For the purpose of acquiring a more complete knowledge of the frequency of this disease dental inspections of the schools have been made lately in the majority of civilized states. The result of these researches was very discouraging. It was expected to find a very bad condition of things, yet no one, not even the odontologist, would have thought that the proportion of children having healthy teeth would be so small. As the researches made in different countries have evidently proved that the frequency of dental caries is nearly everywhere the same, it is of absolute necessity that energetic measures to arrest this evil should be taken.

It has been pretended by some that these dental inspections are of no scientific value, and that they are only a means of advertisement for the dentists. This judgment only proves that those who make such statements are absolutely incapable of comprehending the importance of such researches. If the only thing done had been to attract the attention of the authorities and the public to the importance of the hygiene of the mouth, it would have meant a great advance. Measures of this nature have been taken in different countries. Dental inspection has become compulsory in certain establishments of public instruction; quite a number of schools have an appointed dentist. Everywhere we observe that the public begins to understand the dangers which may follow a neglect of dental hygiene. I will add that even from a scientific standpoint these researches can give very interesting results when the experiments are carried on in the correct way.

The majority of these inspections have been made solely for the purpose of determining the proportion of children suffering from dental caries. In Sweden the plan has been considerably enlarged, and has been placed upon a solid basis. When a few years ago the Swedish Dental Society organized the committee of inquiry of which I have the honor of being the president, the work intrusted to this committee was of a very complex nature. It had to work out statistics of the frequency of dental caries in children of different ages, stating the number of teeth that could yet be saved, the color of the teeth, the hygienic condition of the mouth, the pathological condition of the buccal cavity, the abnormalities with regard to number, size, structure, position, and eruption, and lastly to determine in what way caries or the loss of teeth might affect mastication.

All these matters of investigation are manifestly of great interest from the points of view of general hygiene and stomatology, but it is not sufficient to ascertain the greater or less frequency of caries. The most important thing is to find out the causes of this disease and of its frequency, which increases with every new generation. It will be possible to find the remedy for this evil only when the cause of its frequency shall be known. There is no region where more could be done in the line of prophylaxis than in the domain of stomatology.

There are tendencies to admit that parasitic influence, aided by the action of chemical agents, is the principal cause of dental caries. M. Choquet succeeded in reproducing this disease by the inoculation of microbes that he had isolated. But, if we agree upon the direct cause of caries, we do not agree as to the course of the disease nor as to the conditions which predispose to it. The function of the odontoblasts and the *rôle* which they play against the invasion of bacteria has as yet not been explained. Authorities also differ as to the influence of the calcareous salts contained in the dentin. Basing his ideas on the chemical analysis of a certain number of teeth, Dr. Black has expressed the opinion that neither the proportion of calcareous salts nor the degree of hardness has an influence on the predisposition to caries. Besides, he states that the

teeth badly decayed are as hard, compact, and dense as the teeth perfectly healthy. In spite of the great respect that I have for the scientific views of Dr. Black, I dare to say that it is impossible to reach a certain conclusion by the estimate of the specific weight and by the chemical analysis of the substances contained in the teeth. Researches of another nature will have to be performed. And notwithstanding Dr. Black's excellent method of work and the exactitude of his experiments, he has not been able to avoid this inconvenience. Besides, Dr. Black did not make any use of the microscope, with the aid of which he would have reached altogether different conclusions. The experiments of Black have reference to the dentin, but not to the enamel. The course of caries has been made to depend on two antagonistic factors,—the resistance of the chemical composition of the tooth, strengthened to a certain extent by its vital energy, and the action of acids and of bacteria. The better developed the tooth,—that is, the better the calcareous salts are united to the organic constituents,—it may be expected that the better will be the resistance to the attack of destructive agents. The intensity of this force of resistance depends, first of all, on the qualities of the enamel, according to the conditions of its formation, whether good or defective.

The maxillæ, as well as all the other parts of the body, need exercise in order to reach the point of complete development. The act of mastication fortifies not only the muscles of mastication and the maxillæ, but also produces a more active circulation of the periosteum and of the dental pulp, bringing about a greater renewal of materials and a more abundant deposit of calcareous salts in the tooth.

Besides the defects of formation and of the crowded arrangement of the teeth, many other conditions have been considered as predisposing causes to caries. I will mention only those which, in my opinion, are the more important. One is due to the refinement which modern civilization has introduced into the preparation of our food. While in former times the cutting and crushing of foodstuffs was made nearly entirely by the muscles of mastication and the teeth, to-day the modern culinary art presents to us our food in such a way that mastication becomes superfluous. Rôse has demonstrated that the teeth are in better condition in the regions where hard bread is eaten than in the regions where soft bread is used.

But if the food has a certain influence on the formation of the teeth according to the amount of mastication which it requires, the chemical composition of the food has a greater influence. When determining the nutritive value of foods the physiologist has only taken into account the organic constituents, especially the nitrogenous matter, without considering the inorganic principles. These, nevertheless, are of great importance. For instance, the blood requires a certain quantity of sodium chlorid for its serum and of iron for its globules; the bones and teeth also require a certain quantity of calcium phosphate. If, as the consequence of an insufficient absorption of organic substances, a relative or even

complete emaciation occurs, it is easy to remedy it by means of an appropriate diet. But if the different parts of the skeleton or of the teeth have not found a sufficiency in quantity of the mineral salts necessary for their development, the injury is irreparable.

This absolute necessity for mineral salts has been proved by the experiments of Roloff and E. Voit. They fed a few animals with substances completely deprived of inorganic principles. These animals ate this kind of food with repugnance, and very soon began to show signs of marked wasting. The experiment was continued; cramps took place, and death followed very soon. Foster observed that animals would refrain from eating rather than ingest food-stuffs not containing salts.

This absence of mineral salts could not be counterbalanced by artificial means. The salts can only be digested when they are in combination with organic materials, as they are found in animals and plants. In the purely mineral form they are indigestible, or at least very difficult to digest. The mineral salts, before they can be assimilated, must undergo in the vegetable cells organic synthesis of a nature which is not altogether known.

An experiment of very special interest was performed by E. Voit on pigeons. These animals were fed with substances poor in calcareous salts. They seemed to stand this regimen quite well. After a certain time they were killed, and it was observed that the movable segments of the skeleton were normal, while the fixed and immovable bones, such as the sternum and the bones of the cranium, were frail, and even reabsorbed. The food ingested, not having been able to furnish the necessary calcareous principles for the maintenance of the entire skeleton, passed into the substance of the active bones.

Miller made experiments on dogs which tend to prove that the insufficiency of calcareous substances in the foodstuffs brings about a mineral loss in the teeth. It seems that this phenomenon has been observed in fully developed teeth. Several authors state that during pregnancy the teeth of the mother lose their calcareous matter for the benefit of the skeleton of the fetus. Opinions differ widely on this theory. Galippe believes that the teeth are more apt to decalcify than the bones of the skeleton. A mother who gives daily a liter of milk to her child takes away from her organism 1.232 kgr. of calcium in a year; that is, more than the amount that could be furnished by a diet poor in calcareous principles. Osteomalacia has been observed in milch cows, especially when the production of milk is promoted by artificial means. I will also remark that these violent measures produce a kind of milk which is not of normal composition. A simple glance at the spreading of dental caries in different countries makes us believe that it must be due to some infringement of the laws of nature.

Besides the modifications brought about by civilization in the culinary preparation of our food, are there not also certain defects in the chemical composition of foodstuffs that we should study and fight against? As a general rule we understand by unwholesome food those substances which give rise to the production of acids.

Sugar is classified in this group. We can express ourselves in a better way by saying that good food is that which furnishes all the elements indispensable for the development and maintenance of the body. For us specialists the presence in the food of mineral salts necessary for the teeth, as well as for the entire osseous framework, is of the highest importance.

We read in certain works on physiology that the necessary salts are found in sufficient quantities in a normal diet. If we compare the dry residue of the so-called physiological diet with that of the food *par excellence*,—milk,—we shall find that the former residue has an altogether different composition from the latter, and is, besides, deficient in some of the most important salts. The physiological diet contains only one-tenth of the calcareous salts contained in the milk. On the contrary, the residue from milk is proportionately analogous, from a quantitative standpoint, to the total found in the organism (at least this is the case in dogs and rabbits). It follows from these observations that the foodstuffs generally used only contain about one-tenth of the calcareous salts indispensable for the development and conservation of the body. Let us add that faulty preparation of the food may destroy a large portion of the mineral salts.

Professor Miller has contributed to the elucidation of the question of calcareous insufficiency of foodstuffs. He has demonstrated by comparing the mineral residual percentage of different alimentary substances that there exists a great difference with regard to the quantity of calcium. For instance, the flour of sago only has 8 parts in 100,000, while in cabbage it amounts to 620 in 100,000. Having compared the proportions of calcium phosphate in meat, bread, potato, beer, and water, he concluded that with such a diet the formation of 12 kgr. of skeleton would require, in order to supply the necessary amount of phosphorus, the period of two years, and of calcium ten years and a half. But, as we know, the mineralization of the teeth takes place during the first three or four years of life, and a superabundance of mineral salts must prevail in order that the odontoblasts and ameloblasts should perform their functions in a normal way. The disorders which result from an insufficient supply of calcareous salts during the formative period of the teeth are so evident that we think it useless to insist upon their importance.

If we examine the composition of the food of the majority of our population, and especially of the working classes, we can say that it is poor in calcareous principles. The bread is ordinarily made of the flour, while the bran, which is rich in calcareous salts, is given to cattle. Meat, herring, bacon, and potatoes,—all these substances are poor in calcium salts. With regard to beverages the condition is not better. Milk is being abandoned, to be substituted by beer and coffee,—liquids which contain scarcely any calcium salts; and this condition is made worse yet because of their being given to children, who are in need of substantial diet constantly.

I wanted to study this question more deeply, in order to prove that even under good conditions of nutrition the calcareous salts are

insufficient. I had the food given to our soldiers of our first regiment of artillery examined. The alimentary *régime* is natural, abundant, and of good quality. Young men submitted to exhausting physical exercises require this kind of diet. It is of a higher nutritive value than the so-called physiological diet to which we have already referred. The experiments were made at the Academy of Agriculture, under the direction of Dr. Eggertz. The daily ration of each man is different for breakfast, lunch, dinner, and supper. The ration is composed of milk, bread, herrings, potatoes, beef, oatmeal, barley, pork, peas, cheese, and beer. These foods are distributed every day in variable quantities. For instance, the quantity of milk given varies from 566 grms. to 1185 grms. This diet contains an average of 3.08 grms. of calcium. The Sunday ration contains 3.60 grms.; the minimum, 2.61 grms., is found in the Monday ration.

For the interest of the comparison I will add that a quantity of cow's milk corresponding in nutritive value to one of the foregoing rations would furnish an average of 8 grms. of calcium (the Sunday ration 8.7 grms.; that of Monday 7.1 grms.). This quantity of milk has been determined in order to compare with the portions indicated as percentage of albumin and fat. The carbohydrates are found in small proportions, but it contains twice or thrice as much of calcareous principles.

If, instead of cow's milk, woman's milk is substituted as a term of comparison, an inferior percentage of calcium is observed, as the following numbers prove:

Calcareous portion of Sunday ration, 3.60 grms.; of Monday ration, 2.61 grms.

Woman's milk of the same nutritive value: Sunday ration, 7.79 grms.; Monday ration, 4.75 grms.

Cow's milk: Sunday ration, 8.7 grms.; Monday ration, 7.1 grms.

The objection may be raised that young men, in whom the skeleton is formed, do not need as much calcium as milk contains. To this objection I will answer that neither the teeth nor the skeleton can be considered as being completely developed before the age of twenty-five. I will say that the question of the insufficiency of calcium is of great importance in the developing period, for it is then that the calcium is necessary for the formation of the skeleton and of the teeth. Let us suppose that the child receives the same amount of food as the adult. If this diet is poor in calcareous salts he will suffer from the insufficiency of calcium, especially at the time of the formation of the permanent dentition. If the insufficiency of calcium is general in the food, it is clear that it will be more manifest in those regions poor in calcium than in the chalky ones. But it is difficult to find exact data which would serve to establish the relation between the calcareous proportion found in the soil and the absorption of these salts by vegetables. According to the experiments of Mr. Atterberg, a chemist, the grains cultivated in chalky regions contain more calcium by about fifty per cent. than those cultivated in regions containing a less quantity of salts.

The influence of the quantitative variations of calcium in the vegetables is necessarily more observable in the herbivora, and it is in this species of animals that this difference is more marked. As a general rule the cause of rhachitis and osteomalacia is attributed to the lack of calcium in the soil and in the grass.

Among the carnivora the hyena has strongly developed teeth, covered by extremely hard enamel. These animals, as we know, live on bones. It is difficult to decide whether this exceptional solidity of the masticatory apparatus is due to the abundance in calcareous substances or the masticatory force required with this sort of food.

It is a recognized fact that the shell of the chicken's egg is resistant where the animal lives on a calcareous soil, and that it is very thin and forms a very delicate membrane when this element is wanting. In the inferior animals we observe the same phenomenon. We see that the snail has a very thin and brittle shell in silicious regions, and a very resistant one in calcareous regions. Also the varieties of mollusca are more numerous in the calcareous regions than in the granitic ones.

Until now it has been generally accepted as an axiom that lime-water is detrimental to the teeth. It is for this reason that the experiments carried on by Röse in Baden and Thuringia were the cause of a great surprise. These experiments are known. I will only recall that in the regions rich in calcium Röse found the teeth strongly developed, of a yellowish-white color, and observed relatively few decayed teeth; while in the regions poor in calcium the teeth were of a dirty gray or blue color, and often decayed. The conclusions of Röse are contrary to those reached by Duché, Magitôt, and others in France. The researches of those eminent French *savants* were made from statistics of young men called to the military service, and their data depend on a multitude of facts difficult to control; therefore, although they are very interesting, they cannot serve as a solid basis for statistics on caries.

The interesting character of the question of the influence of calcareous salts on the human organism, and its importance from the hygienic and practical standpoints, made me undertake a series of experiments in Sweden, and I have made out statistics with the data collected by the Committee on Inspection of Schools of the Society of Swedish Dentists. The results obtained show that the relation between the frequency of caries and the proportion of calcium in the water in different points and under different conditions are in accordance with the observations made by Röse in the Black Forest and in Thuringia.

Sweden is a country especially appropriate for researches of this nature because of its widely extended territory, of the different climates found in the northern and southern regions, and because civilization is of a high degree all over the country. The nomadic tribes of Lapps and Finns immigrated into certain regions offer ethnographic characters which are not found anywhere in the rest of the population. The diet is very variable, and it changes according to the different regions. Lastly, the geological formations offer

marked differences. All these circumstances have been taken into account in our inspections.

We have worked in conjunction with the physicians, with the object of obtaining information on the influence of constitutional or contagious diseases. We also sent to the parents of the children a collection of questions, among which we asked if the child had been nourished artificially or by the mother. These questions were as a general rule answered conscientiously. Dentists filled tables with diagrams. This double control over our inspections was for us of great advantage, for it must be recognized that the most careful inspector is liable to commit errors when he has to examine hundreds and thousands of mouths. However, if a small approximal cavity between two molars is left unmentioned, the error is less important from a statistical point of view than an inaccuracy in the numbering of the teeth, which can be verified by our diagram. I believe that I can say that the results presented in our statistics offer all desirable accuracy.

The number of children examined is above 16,000; that is, about 385,000 teeth. After certain researches and certain complementary verifications are made, the number of children examined will be 20,000.

With the purpose of giving you an idea of the information that is to be derived from such work in statistics, I will communicate a study made on 6800 children (roundly, 160,000 teeth) from the schools of different parts of Sweden. The selection of schools was made in such a way that the number of boys and girls examined was nearly alike. I selected regions where no special feature would predominate, as, for instance, calcium.

The following tables, in which only the permanent teeth have been taken into account, give in consequence an average condition of the teeth of the children of our schools.

In these tables the variations in the percentage of alimentary calcium and the action exercised by this influence have been recorded for the totality of children as well as for the groups of different ages.

The four following tables—viz, Tables IV to VII—indicate the percentage of decayed permanent teeth according to the color of the teeth, the conditions of general health, the influence of more or less careful hygienic attention, and the most common infantile diseases. It can be seen from these exhibits that in Sweden the white teeth or the yellowish-white ones offer greater resistance to caries; the blue and grayish ones offer a great deal less. The effects of dental hygiene are evident; the proportion of decayed teeth is seventy-three per cent. higher in dirty mouths. It is shown by Tables VI and VII that the general state of health or the existence of the diseases there shown separately have their influence over the frequency of dental caries. The children whose health is good have an average of 17.7 per cent. of decayed teeth. Those who have suffered from the influence of some infantile disease give an average of 20.9, and in those who have not suffered from such diseases the average is 16.5 per cent.

It is surprising that rhachitis is, of all diseases, the one in which the lowest number of carious teeth is recorded, especially after the tenth year is passed. I have also tried to establish the relation that exists on the one hand between the dentition of children that have been nourished by the mother and those nourished artificially and rhachitis on the other; the fact seems to be that the children nourished by the mother have the better dentition.

A certain number of schools did not give the information required of them. It is for this reason that these data cannot be considered as absolute. If there exists a difference, and this is what clinical experience tends to prove, there must be a possibility of making tables, from the examination of a considerable number of teeth, which would permit the elimination of all the other factors, as dental hygiene, percentage of calcium, etc.

Table VIII gives a general view of the percentage of permanent teeth in children of different ages, with the percentage of carious teeth, with due consideration of differences which may be found in the upper and lower jaws. Tables IX and X show this more in detail. Table IX indicates the resistance of different teeth. It should be especially remarked that the percentage of caries is greater in the upper than in the lower incisors. On the contrary, the second bicuspid, and especially the lower molars, are found to be decayed with greater frequency than the corresponding ones in the upper jaw. The girls present a higher number than the boys of the same age. As can be seen by Table X, the teeth of young girls erupt six months earlier than those of boys. It also follows from that table that this difference in age does not suffice by itself to explain the increased percentage of decay among the girls.

Table IX presents several interesting points with regard to the first molars. Dental caries, which in these teeth increases nine per cent. per year from the age of seven to that of ten or eleven, remains in unchanged proportion in the years which follow. Hence it seems that when the age of ten or eleven has been reached the teeth seem to offer a greater resistance to the influence of dental caries than before (this probably is due to the falling of the second temporary molar). A parallel can also be established between the resistance of the first and second molars if we compare these two teeth at the time when, according to the table of dentition, they are found in equal numbers; that is, for the first molar the age of seven to eight, and of fourteen or fifteen for the second. We find, then, that the proportion of caries is more or less the same in both cases. In the upper jaw the first molars are less attacked than the second; in the lower jaw the contrary is the case. These facts ought to be taken into consideration when it is a question of performing the symmetrical extraction of the first molar. I have always been against the premature extraction of this tooth, and believe that the fact here stated constitutes a new point in favor of my opinion.

Table X indicates the percentage of permanent teeth. Among the interesting points of this table, I will call your attention to the time of the eruption of the canine and of the bicuspid in the upper

jaw. They erupt in the following order: The first bicuspid, then the second bicuspid, then the canine. On the contrary, in the lower jaw we have first the canine, then the first bicuspid, then the second bicuspid. According to my calculation, the period of eruption is as follows:*

	BOYS.				GIRLS.			
	UPPER JAW.		LOWER JAW.		UPPER JAW.		LOWER JAW.	
First Molar.....								
Central Incisor.....	7 yrs.	11 mos.;			..... 7 yrs.	5 mos.;		
Lateral Incisor.....	8 "	11 "	7 yrs.	10 mos.	..... 8 "	7 "	7 yrs.	8 mos.
Canine.....	12 "	2 "	11 "		..... 11 "	6 "	10 "	2 "
First Bicuspid.....	10 "	7 "	11 "		..... 10 "	1 "	10 "	4 "
Second Bicuspid.....	11 "	2 "	11 "	4 "	..... 10 "	11 "	10 "	10 "
Second Molar.....	12 "	10 "	12 "	4 "	..... 12 "	6 "	12 "	1 "

Boys, as a general rule, have sixteen of their teeth (fifty per cent.) erupted at the age of ten years and a half; girls, on the contrary, have half of their teeth erupted at the age of nine years eleven months and a half.

TABLES.

TABLE I.—*Calcareous Proportion contained in the Alimentary Rations of Soldiers for Two Days.*

SUNDAY.				MONDAY.			
772 grm.	milk.....	1.26 grm.	CaO.	556 grm.	milk.....	0.92 grm.	CaO.
810 "	bread.....	1.52 "	" "	610 "	bread.....	1.14 "	" "
65 "	herring.....	0.07 "	" "	65 "	herring.....	0.07 "	" "
670 "	potato.....	0.17 "	" "	670 "	potato.....	0.17 "	" "
270 "	beef.....	0.11 "	" "	200 "	bacon.....	0.06 "	" "
40 "	oatmeal.....	0.04 "	" "	150 "	peas.....	0.19 "	" "
500 "	light beer.....	0.02 "	" "	60 "	oatmeal.....	0.04 "	" "
60 "	cheese.....	0.41 "	" "	500 "	beer, very light..	0.02 "	" "
187 "	albumin.....	} 3.60 "	" "	252 "	albuminoids..	} 2.61 "	" "
93 "	fats.....			125 "	fats.....		
288 "	carbohydrates			288 "	carbohydrates		

TABLE II.—*Relation between the Frequency of Caries and the Hardness of the Water.†*

SWEDEN.	Hardness of the Water.	Percent- age of Children with Caries.	Percent- age of Decayed Teeth.	GERMANY.	Hardness of the Water.	Percent- age of Children with Caries.	Percent- age of Decayed Teeth.
Boras.....	0.5°	97.7	25.0	Three vill. in Thuringia	1.1°	98.5	35.0
Karlshamn.....	4.8°	93.9	23.0	Two " " "	4.0°	93.7	27.5
Malmö.....	12.0°	90.3	15.4	Two " " "	13.0°	84.5	18.3

*The first molars and also the central incisors of the lower jaw do not appear in this table, which does not commence until the seventh year.

†The difference between Swedish degrees and French degrees is in the ratio of 56° Swedish to 100° French.

TABLE III.—*Relation between the Hardness of the Water and Dental Caries.*

AGE.	HARDNESS OF THE WATER IN SWEDISH DEGREES.			
	0.0°-2.5°.	2.5°-5.0°	5.0°-10°.	10°-15°.
A.—PERCENTAGE OF DECAYED TEETH.				
8- 9 years.	31.1	29.6	21.2	18.7
9-10 "	28.1	27.7	20.5	10.5
10-11 "	25.8	22.9	18.6	10.6
11-12 "	23.7	20.4	18.1	10.0
12-13 "	24.9	18.7	16.8	10.3
13-14 "	26.6	20.1	17.7	12.2
14-15 "	27.3	21.5	19.6	14.8
Average	25.9	23.3	18.8	11.8
B.—CHILDREN WITH DECAYED TEETH.				
Average	96.1	95.8	92.8	75.0

TABLE IV.—*Relation between the Color of the Teeth and the Frequency of Caries.*

AGE.	PERCENTAGE OF DECAYED TEETH.			
	White.	Yellowish White.	Yellow.	Grayish Blue.
8- 9 years.	16.2	14.0	23.5	18.0
9-10 "	12.5	16.2	21.4	23.0
10-11 "	14.7	16.7	20.4	20.7
11-12 "	13.5	16.4	20.3	24.0
12-13 "	14.7	16.0	20.6	23.5
13-14 "	15.0	16.8	18.8	27.8
14-15 "	15.5	17.5	17.9	27.4
Average	14.3	16.4	20.0	24.3

TABLE V.—*Relation between Dental Hygiene and Dental Caries.*

AGE.	PERCENTAGE OF DECAYED TEETH.		
	Clean.	Moderately Clean.	Unclean.
8- 9 years.	11.0	18.2	21.8
9-10 "	11.6	16.4	24.1
10-11 "	14.4	17.4	22.6
11-12 "	13.3	17.8	22.4
12-13 "	14.5	17.9	24.0
13-14 "	12.5	19.4	24.6
14-15 "	14.9	20.5	22.7
Average	13.4	18.4	23.2

TABLE VI.—*Relation between the General State of Health and Dental Caries.*

AGE.	PERCENTAGE OF DECAYED TEETH.	
	Good Health.	Moderately Good or Bad.
8- 9 years.	15.8	22.4
9-10 "	16.4	19.3
10-11 "	18.0	18.9
11-12 "	17.2	20.1
12-13 "	17.3	21.6
13-14 "	18.2	23.1
14-15 "	19.2	23.9
Average	17.7	21.0

TABLE VII.—*Relation between Certain Diseases and Dental Caries.*

AGE.	CHILDREN PRESENTING SYMPTOMS OF					
	Rhachitis.	Scrofula.	Anemia and Chlorosis.	Diseases of the Digestive Tract.	Average.	Children without Symptoms of Diseases Mentioned.
8- 9 years.	28.7	21.6	22.1	24.2	22.0	12.5
9-10 "	22.0	16.5	21.2	22.1	20.2	14.4
10-11 "	15.7	19.8	19.6	20.4	18.9	17.6
11-12 "	19.2	19.7	20.7	21.4	19.9	16.2
12-13 "	18.1	21.0	22.8	22.1	20.3	16.8
13-14 "	20.8	22.7	24.5	24.0	22.9	16.4
14-15 "	22.7	24.4	26.0	30.9	24.4	17.0
Average	19.7	20.9	22.2	22.7	20.9	16.5

TABLE VIII.—*Number of Permanent Teeth and Frequency of Caries in the Different Ages.*

AGE.	NUMBER OF TEETH IN 100 CHILDREN.						PERCENTAGE OF DECAYED TEETH.					
	BOYS.			GIRLS.			BOYS.			GIRLS.		
	Upper Jaw.	Lower Jaw.	Total.	Upper Jaw.	Lower Jaw.	Total.	Upper Jaw.	Lower Jaw.	Total.	Upper Jaw.	Lower Jaw.	Total.
7- 8 years.	283	432	715	308	452	760	9.6	14.3	12.5	16.6	22.1	19.9
8- 9 "	450	577	1027	506	604	1110	14.8	19.4	17.4	15.2	18.9	17.2
9-10 "	643	685	1328	689	751	1440	14.9	16.9	15.9	16.4	18.7	17.6
10-11 "	775	817	1592	855	937	1792	16.3	16.2	16.2	20.6	18.8	19.6
11-12 "	960	1016	1976	1015	1114	2129	16.6	16.4	16.5	20.7	17.1	18.8
12-13 "	1125	1192	2317	1191	1247	2438	15.8	15.8	15.8	23.1	18.4	20.6
13-14 "	1265	1301	2566	1303	1337	2640	17.9	15.7	16.8	23.4	18.6	21.0
14-15 "	1347	1352	2699	1351	1369	2720	17.4	15.9	16.6	26.8	19.6	23.2
15-16 "	1382	1375	2757	1389	1381	2770	21.6	15.9	18.8	24.6	17.5	21.1

TABLE X.—Number of Permanent Teeth at Given Ages in 100 Children.

BOYS.										GIRLS.										
AGE.	UPPER JAW.					LOWER JAW.					UPPER JAW.					LOWER JAW.				
	1st and 2d Incisors.	Canine.	Bicuspsids.	1st and 2d Molars.	1st and 2d Incisors.	Canine.	Bicuspsids.	1st and 2d Molars.	1st and 2d Incisors.	Canine.	Bicuspsids.	1st and 2d Molars.	1st and 2d Incisors.	Canine.	Bicuspsids.	1st and 2d Molars.				
RIGHT SIDE OF THE JAW.										LEFT SIDE OF THE JAW.										
7-8 yrs.	46	4	...	86	...	86	36	2	1	1	1	1	1	2	86	41	2	2	94	...
8-9 "	89	28	2	99	...	99	77	5	4	2	100	88	...	...	100	84	5	4	99	...
9-10 "	97	75	6	100	2	100	96	15	16	14	100	1	1	3	100	97	31	21	100	2
10-11 "	99	92	10	100	3	100	99	35	36	32	100	6	6	40	100	99	59	44	100	12
11-12 "	100	98	36	100	15	100	100	66	65	53	100	27	100	59	100	100	84	64	100	33
12-13 "	100	98	57	100	42	100	100	87	83	71	100	55	100	80	100	100	94	78	100	63
13-14 "	100	100	83	100	63	100	100	96	94	86	100	75	100	99	100	100	98	92	100	81
14-15 "	100	100	93	100	85	100	100	99	99	92	100	86	100	99	100	100	100	96	100	90
7-8 yrs.	48	6	...	87	...	88	35	2	...	...	92	...	52	10	87	41	2	2	94	...
8-9 "	86	30	1	99	...	99	79	5	4	2	100	...	90	46	100	85	6	8	100	...
9-10 "	96	75	5	100	3	99	95	14	17	16	100	2	98	85	100	97	30	20	100	2
10-11 "	99	92	12	100	4	100	99	34	38	34	100	4	100	95	100	99	58	44	100	15
11-12 "	100	98	35	100	15	100	100	63	63	53	100	26	100	98	100	100	85	64	100	33
12-13 "	100	97	59	100	43	100	100	87	83	72	100	54	100	99	100	100	94	77	100	62
13-14 "	100	99	81	100	65	100	100	96	93	86	100	75	100	99	100	100	98	90	100	82
14-15 "	100	99	92	100	87	100	100	100	98	91	100	87	100	100	100	100	100	97	100	87

Discussion.

Dr. DUBOUCHER. It is just a question of assimilation of calcium. You know that we have been trying for some time to devise a means of assimilating calcium. The question of hygiene is also a factor in this problem.

Dr. HESS. I will say, first, that calcium is present in milk in sufficient quantity; hence a child that is nourished on milk will always have a sufficient supply of calcium. Next, with regard to the tables presented by Dr. Förberg there is one noticeable feature in his having given us the relation of age. In the statistics that have been made by others this condition has been omitted. We must congratulate Dr. Förberg on his interesting statistics.

Dr. T. W. BROPHY, of Chicago, then read his paper entitled "The Surgical Treatment of Palatal Defects."*

Discussion.

Dr. GIRES. How many cases have you had, and how many deaths?

Dr. BROPHY. In my paper I stated that I have carried out 570 operations, 211 of which were on infants under five months. In these infants there were no deaths; of patients at three years there were two deaths,—the entire mortality of the whole series.

Dr. SEBILEAU. I regret not having known the very remarkable work of Dr. Brophy. I would have felt better prepared, not to bring up new arguments, but to make just a few remarks. This morning I was in the Ecole Dentaire, and, thanks to the kindness of Dr. Hugenschmidt, I was able to get some details as to the operative procedure of Dr. Brophy. I was not able to get a copy of his paper, and, as I do not understand English, I hope to be excused if I make any error in my remarks. It seems to me that this remarkable work includes many interesting points that will serve as the basis for my little extemporaneous address.

I believe that the question of operative peculiarities should be separated from the phonetic education. I will make a few remarks in this direction in order to emphasize the importance of Dr. Brophy's article. First of all we have the question of statistics. It is certain that the arguments of Dr. Brophy are superior to any others. He has operated upon 211 young infants, and has not had a single fatal case. I can assure you that there is not another surgeon who can show such remarkable results. I will make use of these wonderful results to demolish that which until to-day I thought was the truth.

The second important point to which I shall call your attention is the age at which it is advantageous to operate upon cases of cleft palate. In spite of the many attempts that have been made during these last few years to induce surgeons to operate at an early age, we must confess that in France, as well as in nearly every other country, all these attempts have been fruitless. We have had here in France very decided partisans of operation at a more advanced

*This paper is printed in full at page 317 of this issue.

age. In Paris we have Dr. Le Dentu, who told me that he operates for hare-lip at six months; when complicated with fissure of the alveolar plate, from six months to two years, and in cases of cleft palate at from six to seven years. Hence you see the great difference between the two methods. We can say that there exists a great difference between our procedure and the one of Dr. Brophy, who intrepidly operates on infants six weeks old; not only upon the soft parts, but also closes the cleft in the palate. I believe that it was in 1894 or 1895 that a surgeon of Berlin made a few attempts to introduce this method, but it has not been followed.

Professor Brophy attributes the absence of shock to nervous influence. This may be so. The fact that must be brought out of this communication is that, while we all thought that it was a very serious affair to operate before a child was six months of age, and that we must wait until it was six or seven years old, Dr. Brophy has operated upon 211 children ranging from five weeks to four months. We must admit that we have been in complete error; that we have operated badly, and under unfavorable conditions.

Next comes the question of the priority of the palatal operation over the labial one. We must recognize that it is a mistake to say that the easiest operation should be performed first. Dr. Brophy says that the palatal should be the first one to be performed, as the labial deformity can be corrected at any time; and Dr. Brophy is right, as his statistics prove. His operative procedure differs in principle from ours. The difference consists in these two important factors: He makes a real osseous operation, while we only make a fibro-mucous restoration. He does not make at either side of the alveolar arch those deep fissures that we do in order to bring together the bony parts. If this is not done we have to bring together the soft tissues, and, as these are not as elastic as the circumstances require, we have been obliged to make incisions which in many cases have been responsible for the accidents which have followed these operations.

As I said, Dr. Brophy's method differs completely from ours. He makes a true osseous operation, bringing together the two portions of the maxilla; and in this way avoids the necessity of making those longitudinal, palatal, and para-alveolar incisions. The avoidance of the necessity for these incisions is of considerable importance.

The consequences of operations upon the hard and soft palate are of two kinds,—immediate and remote. The immediate consequences have seemed the most serious until to-day, and it is to them that we owe the relatively high number of fatal cases, while it is owing to the total suppression of these consequences that Dr. Brophy has not had a single fatal case. Statistics show that in staphylo-palatal operations the death rate ranges from ten to thirty-five per cent.; hence you can see the enormous difference between this number of deaths and the absence of fatal cases as reported by Dr. Brophy.

This difference cannot be altogether attributed to the fact that he operates on infants of a very early age, when the nervous system

is not very well developed, and hence better able to withstand shock.

What are the consequences of the *modus operandi* of Dr. Brophy with regard to operations upon the hard palate? If the old system be followed two incisions have to be made, for the reasons already explained. If they do not divide the anterior portion of the palatine artery, they do its anterior prolongation, and hence the principal branches are cut off at their origin. The consequences of this condition are hemorrhage and gangrene. I remember that some years ago my teacher, Dr. Le Dentu, performed successfully a palatal operation. We left the patient in very good condition, but a few moments after were recalled, as a profuse hemorrhage had unexpectedly occurred, which it was feared would be fatal. Sometimes hemorrhage takes place before the operation, and sometimes after. Now, children under six months would lose less blood. For this reason we had in France the idea that operations of this nature should not be performed until the child reaches the age of six or seven, when it would be in a position to survive an operation followed by hemorrhage. Dr. Brophy, if I have understood him aright, does not make any incisions, consequently he does not cut the artery, and neither hemorrhage nor gangrene follows. It is a great thing to have devised this method of operating upon children at a very young age, and to have originated a method which overcomes in a radical manner the only two real inconveniences of these operations,—the section of the artery and the possible hemorrhage.

The first objection that I made to Dr. Brophy this morning, with Dr. Hugenschmidt as intermediary, is the following one: How is the development of the maxilla affected by early operations? It has been my opinion until to-day that early operations—those that are performed when the child has only lived for one year—could be the cause of atrophy. I believe that Hermann and Delorme were the first to point out the absence of development of the maxilla in some cases, and an excess of development of the mandible in others, as the consequence of this kind of operation. Sometimes an arrest in the development of the maxilla takes place, but this is surely caused by different conditions, and not by the operation. On the contrary, I question if the fact of operating at an early age does not favor the development of the maxilla. When only the fibrous mucous membrane is brought together a constant tension is exercised, and, as the maxillæ in the child are not resistant, an obstacle is established against their normal development. It is very important to bring together the two maxillæ irregularly developed. There is something very interesting in Dr. Brophy's statistics, and that is the fact that all his patients have normal and well-developed maxillæ. He has always observed that even in patients with considerable deformities a restoration of the articulation occurs. This is most interesting.

I just want to make another remark with regard to the phonetic education of patients who have undergone operations for the closure of fissure of the hard palate and of the velum palati.

It must not be thought that we believe that after a patient has

been operated on for a complicated hare-lip our duty is completed. Well, gentlemen, we are then so far from that point that after the operation has been successfully performed the patient speaks worse than before the intervention. I have observed a great number of cases,—those that I have operated on, and those that I have been able to observe. There is a little patient, the one that I have spoken of at the beginning of my remarks and who nearly died from the consequence of that profuse hemorrhage. This patient speaks to-day less correctly than he did before the operation. The muscles of those patients do not work well, and during months and years they are unable to use them. This young man was operated upon seven or eight years ago. He is progressing gradually, but as yet his speech is very imperfect, notwithstanding the phonetic training, singing lessons, and his constant efforts toward improving his speech. This is exactly in accordance with the ideas of Dr. Trélat, who advised that the patient should be given a phonetic training previous to the operation; after the patient had taken talking and singing lessons for several months he consented to the operation. He had observed that under such conditions the patient could learn more easily how to talk, and in this way he suppressed, if not completely, at least partially, the radical defect of all the operations upon the palate; that is, the difficulty the patient, after the operation, experiences in talking. Dr. Brophy, as you know, operates upon the patient when under six months, at a period when they have all the time required for a thorough phonetic education.

Before concluding my remarks I want to make known my admiration for the man that has devised such an operation. To men who have been trained in surroundings absolutely opposed to the views of Dr. Brophy the results seem admirable. At any rate, it just proves that things which we considered to be the truth may be nearer to error, and that there is no subject, though it may have been considered settled, in which room for further study cannot be found.

The PRESIDENT. After the remarks of Professor Sebileau we have nothing left to say about Dr. Brophy's paper. We are very glad to have had Dr. Sebileau discuss Dr. Brophy's article. I will say here that Dr. Brophy is the dean of the Chicago College of Dental Surgery, and two years ago was the president of the National Association of Dental Faculties. His work, as in the case of that of Dr. Michaels, is worthy of much praise inasmuch as their studies are to some extent outside of the limits of our specialty; they are at the confines of dentistry. We are proud of their success, and we extend them our unanimous congratulations.

Dr. BROPHY. Before Dr. Sebileau leaves the room may I be permitted to say one word? I wish to say that if nothing else had occurred to give me pleasure during my stay in Paris, it would have been quite sufficient to have had the distinguished representative of surgery in this great city come to this Congress and discuss my paper. I could not follow his remarks, as I do not understand French; but no matter what those remarks were, no matter what his criticisms were, I want in this public way to thank him for his presence.

SECTION II.—SPECIAL PATHOLOGY AND BACTERIOLOGY.

The Section was called to order at 4.25 P.M. by its president, Dr. Frey. He then said that, as the essayists who appeared on the program were absent, he would call on Dr. Siffre.

Dr. SIFFRE. I did not think that I would be called upon to talk to you, or, to express myself better, I did not intend to do it. I will submit to your consideration the result of a few observations that could serve as a basis for further research, but which now I am unable to present in a complete way because I have not the necessary documents.

It has happened to me to observe that in certain adults a space is found at the level of the lower bicuspid, this being the only abnormality that could be observed in such cases. I wanted to find out the cause of the formation of this space, but I will confess that at first I could not find a solution to the problem; but I was lucky enough to treat a patient who furnished me with the necessary explanation. It was a young girl, who at the age of nine had her first molars extracted. When she came to see me she had only the four incisors in the lower jaw, while the maxilla was more or less normal. I took an impression, which I have kept. To-day her lower jaw is nearly complete, with the two bicuspid and the second molar on either side. I observed at that time that the first bicuspid did not come in contact with the canine. (Dr. Siffre explained the position of the canines, bicuspid, and molars by means of a drawing executed on the blackboard.)

From this fact we can draw the conclusion that the extraction of the deciduous teeth should be performed cautiously, and that it is always better to preserve them by any possible means. Besides the formation of this space by the premature extraction of deciduous teeth, I believe that a deviation of the canine can also take place, because this tooth has the same conditions as the bicuspid. This is not the full text of my communication; it comprises a great number of considerations, but here, *ex abrupto*, I cannot tell you all. I will bring the models some other time to show you that this influence is manifest and that you may observe the effects upon the molars.

I think that we could also draw the conclusion that it may be possible that the extraction of all the deciduous teeth would not have any bad effect upon the normal distribution of the permanent teeth, for if only a certain number of teeth are extracted only that portion of the maxilla where the teeth were extracted will change and will not be in relation with the opposite side of the maxilla; but if, for instance, the ten deciduous teeth are extracted, I do not see why the distribution of the permanent teeth should be interfered with.

The next essayist on the program was Dr. Poinot, and, as he was not present, Dr. Siffre made the following remarks on

THE EVOLUTION OF THE DENTAL ARCH.

If a child having his twenty teeth is made to bite on a piece of wax you will notice a series of indentations corresponding to an

arch. This is what I will call the dental arch. This dental arch will be the dead point of the muscular forces which develop around the osseous arch represented by the jaw at the time when the teeth are solidly fixed; that is, at the time of the eruption of the first molar. Hence I believe that it is evident that at the moment of the eruption of a tooth this tooth undergoes a pressure from within outward, and one from without inward, and the tooth will take a position at the inert point; that is, at the point where an equilibrium of forces occurs.

If we look upon the relation of the dental arches with the articulating line we shall see that the teeth of the lower jaw are in a position internal to the teeth of the maxilla. When the twenty teeth are fully erupted this articulating line will become fixed, and will not change any more during life. Let me give you a few proofs of what I have said.

The patient was a boy of eight years, who came to consult me for the first time on February 9, 1893, for a small abnormality. After measuring the teeth on the model I found that the antero-posterior axis of the teeth was as follows: The two central incisors had 9 mm., the two lateral incisors more or less 9 mm., the canines 13 mm., the two first deciduous molars 15 mm., the two other molars 20 mm., making altogether 66 mm.

This patient had a few teeth extracted. On June 25, 1899, the permanent dentition had completed its evolution, and after careful measuring we found the following dimensions: The two central incisors 12 mm., the lateral incisors 11 mm., the others 42, which gives us a total of 65 mm. This is a proof that the size of the permanent arch had not increased, for it is even inferior to the actual size of the temporary arch.

(Dr. Siffre then made a demonstration on the blackboard, and quoted two other cases which gave the same results.)

I think that this is sufficient proof that the permanent dentition makes its evolution in the same arch as the temporary one. You can make for yourselves these measurements, and you will be convinced and surprised.

Dr. POINSOT then spoke as follows on

THE RELATION OF ADENOID TUMORS TO THE DEVELOPMENT OF THE MAXILLÆ.

Dr. Larmoyer was visited at one time by one of his patients, who reproached him for not having warned her not to have any operations in the mouth performed simultaneously with the treatment of affections of the respiratory system. The doctor answered that he was ignorant that the patient (her child) was having his teeth treated. The child was under the treatment of the dentist and of the laryngologist at the same time. The dentist made a model and gave a scientific reason for the irregular development of the teeth on account of a lack of development of the maxillæ; he decided to perform a few extractions in order to bring about an improvement of the existing conditions. The adenoid vegetations were then removed; this resulted in a rapid development of the

maxilla, and in such a way that the space, which was slight, became considerable.

We can deduce from this case an important point: that the development of the maxilla is very often interfered with by the presence of adenoid tumors, and sometimes even by the presence of hypertrophied tonsils. This confirms the mathematical theory of Dr. Siffre.

Dr. SIFFRE. I have observed that the presence of adenoid vegetations results in the formation of V-shaped arches. If these are removed the development will then be continued.

If we accept the theory of Dr. Ducournau, we will reach different conclusions from the standpoint of the prophylaxis of irregularities; but when we shall be well convinced, as I am, that the arch does not develop, we shall begin to enter into a period of departure from the empiricism in which we now are with regard to irregularities. We have authorities who have written very much on these questions, but I do not agree with them.

Dr. FREY. We must thank Dr. Siffre for his communication, which is indeed of great importance. It is regrettable that only so few members should have been present. This paper mathematically proves that the space occupied by the deciduous teeth and by the first molars is a definite one. Andrieux had mentioned this fact, which is gradually being accepted; at that time it was based merely on observation. To-day we are able, due to Dr. Siffre's researches, to enter into a period of mathematical orthopedia, and we know exactly what we want to do. By our correction of displaced teeth we shall bring about a normal development of the jaw,—a factor of considerable importance. Those cases in which, after a successful regulating operation, the teeth tend to regain their original positions are, in my opinion, operations which, though apparently successful, are not according to mathematical rules; hence the teeth make efforts to take their natural position.

A MEMBER. I would like to ask Dr. Frey what is the difference in the treatment whether the measurements are taken or not.

Dr. FREY. Let us suppose that we are treating an ideal case, the patient being a child. We would take an impression of the mouth, and would measure the temporary arch; and very often we should leave teeth which otherwise we would have extracted, judging from a practical standpoint. By measuring the arch we should see that it was not necessary to extract any teeth, as even after separating all the teeth we should have a permanent arch equal to the size of the temporary arch. The following of Dr. Siffre's plans would complicate slightly the regulating operations, but that increased work should not be considered, inasmuch as the result would be more definite. It will take a longer time; we shall have to use greater patience, but we shall be rewarded by being able to say that we have kept within the limits of physiological laws.

The tendency of to-day is to regulate teeth, but with the aim to preserve teeth as much as possible it sometimes requires great efforts to conclude an operation without extracting some teeth.

A MEMBER. If I have correctly understood, the treatment would

in all cases imply the increasing of the diameter of the arch to correct any kind of irregularity. Now, in cases where the teeth are very close together you can see readily the question would arise whether it would not be preferable to extract a tooth instead of carrying the incisors to the place of the canines. I would rather extract a bicuspid or push a canine backward, and I would not trouble myself about the mathematical accuracy of the arch.

Dr. SIFFRE. That is just your personal opinion. You also would not treat a case of irregularity if you did not feel like doing it. I separate my teeth from the center, and I gain space equivalent to the difference between the sizes of the original and the new diameter.

Dr. FREY. We have yet to listen to Dr. Poincot's communication. We will close this very important discussion by thanking Dr. Siffre for the results that he has obtained.

Dr. POINCOOT then made the following remarks:

ON THE OCCURRENCE OF SPLITTING IN TEETH.

In 1881 or 1882 I brought before the Société d'Odontologie the cases of teeth that had split while in the mouth. I will confess that my communication was not very successful, and I was very much criticized; but, by a lucky coincidence, some time afterward the same men that contradicted me presented similar cases. I was asked for the cause of such an occurrence, and I answered that I ignored the cause, for my object was just to present a clinical fact.

Some years ago I discussed the matter with a professor of the Pasteur Institute, who gave the following reason: The micro-organisms which develop in dead teeth have the property of forming gases, and at a certain moment the pressure is so great that the tooth splits.

These facts seem altogether extraordinary, but they are not so strange as might be thought. In order to experiment I took several teeth and placed them in a glass tube. The pressure of the gases was such that the tube broke. The tube contained the dead teeth, and the pressure caused by the gases of decomposition was strong enough to cause the breaking of the glass.

Dr. FREY. We thank Dr. Poincot very much for his very interesting observations.

SECTION III.—OPERATIVE DENTISTRY; SPECIAL THERAPEUTICS.

SECTION IV.—GENERAL AND LOCAL ANESTHESIA.

SECTION V.—PROSTHESIS, DENTAL ORTHOPEDIA, AND FACIAL RESTORATIONS.

[JOINT SESSION.]

The session was called to order at 4.10 P.M., and a paper, entitled "Arrest and Prevention of Caries in Temporary Molars by the Use of Metallic Crowns,"* was read by Dr. CLAUDE MARTIN, Lyons.

*Printed in full at page 351 of this issue.

Discussion.

Dr. ROSENTHAL. We have listened to an interesting communication on the crowning of deciduous teeth. It seems to me that this treatment is a little heroic. To place four crowns as soon as the sign of caries appears seems to me to be a cruel act, especially when we consider the sensitive and impressionable character of children. I say cruel because in order to place caps it is indispensable to prepare the crowns, and the deciduous teeth are more sensitive than the permanent ones. This surely must make the operation a very difficult one. The crown of the tooth must be prepared in order that the artificial one should be in close contact with the tooth. I could very well understand this kind of treatment if the caps only covered the affected tooth. This is a procedure that I have never tried, but it seems to me that it is not reasonable to crown four teeth when only one is affected. I do not see the reason for such a treatment. Dr. Martin has told us that it is to avoid the opening of the bite, but you can obtain the same result by taking from the masticating surface of the tooth a thickness equal to the thickness of the cap; the articulation would remain normal. In consequence I do not see why we should submit our patients to a quadruple operation.

Dr. MARTIN. My statement that the four molars should be crowned is because if a single crown is placed the bite will be opened, and the entire force of mastication will fall upon that tooth. Dr. Rosenthal has told us that he does not see the necessity of crowning the four molars. It is for the purpose of avoiding the difficulties of placing a single crown in the mouth of a timid child. I said a few moments ago that the operation should be rendered as painless as possible. In consequence the masticating surface must not be touched, neither the lateral surfaces. At the utmost, the teeth can be separated because, on account of the anatomical form of the deciduous teeth, they can be crowned without the necessity of grinding away any portion of the tooth. For even if a shoulder should be formed at the neck of the tooth, it could be covered with cement; this would protect the tooth. It is not necessary that the crown should adapt itself as well as in a permanent tooth.

Dr. DARSON. I agree altogether with Dr. Rosenthal. It is certain that children are highly sensitive, and that if a crown is to be placed in a perfect manner it has to adapt itself perfectly against the cervical portion of the tooth. The masticating surface of the teeth must be reduced to a desired point, so as not to interfere with the normal articulation. Dr. Martin told us that the work is the same for a tooth that is threatened with caries. This seems to me to be an extraordinary statement. The teeth are always threatened with caries. We do not know where caries begins, but we know how far it can go. All the teeth are susceptible of becoming carious, and to say that as soon as the enamel begins to show signs of decalcification it must be crowned does not seem to me to be justifiable. But, as Dr. Rosenthal has discussed this point, I will only talk of the opening of the bite. Such a condition, in my opinion, presents serious inconveniences. We know children whose bites

have been opened, and who are to-day more susceptible to diseases of the mucous membrane. The maxillæ should be as they are normally, and any departure from this point presents inconveniences. These inconveniences would probably exist in an abnormal condition as created by Dr. Martin's method. It seems to me that it is a serious thing to produce an opening of the bite, a condition which until now has been detrimental to the mucous membrane. I do not accept and could not follow Dr. Martin's method.

Dr. ROSENTHAL, JR. In the article by Dr. Martin there is one point that he has spoken about but has not insisted upon which furnishes another argument in favor of what he has said with regard to the nutrition of the child. Very often children abandon the idea of taking any food because they fear the pain that the act of mastication would cause them. This induces in the child a condition of depressed vitality. It is evident that a child that does not take the proper amount of food has every chance of not reaching adult age. This consideration, I believe, is enough to compensate for a great number of opposite arguments.

Dr. ROSENTHAL, SR. I am not opposed to the placing of one crown, but I am against the placing of four crowns.

(To be continued.)

AMERICAN DENTAL CLUB OF PARIS.

THE American Dental Club of Paris held its monthly meeting on December 2, 1899, at the residence of Dr. Spaulding, where the following gentlemen were present: Drs. Du Bouchet, Roussel, Spaulding, Crane, Daboll, I. B. and W. S. Davenport, Barrett, Hirschfeld, Burt, Hotz, Conrath, Geo. Ryan, Robinson (of Bordeaux), Theo. Evans, Gires, Michaels, Wetzels, Meriam, and Dower. Dr. Du Bouchet, president, was in the chair.

A resolution was voted "To transmit to Mons. Godon, director of the Ecole Dentaire de Paris and president of the Commission of Organization of the International Dental Congress of 1900, our felicitations on the occasion of his decoration as Chevalier of the Legion of Honor by the French Government."

Dr. ROUSSEL demonstrated Dr. Strang's method of combining cement and amalgam, and accompanied the same with the following remarks: "Dr. Strang takes any kind of amalgam, and when prepared as usual for filling, places it in a mortar and adds to it a quantity of cement powder equal to one-third of its volume and thoroughly mixes the two together. To this is added the cement liquid, and the mixing is completed as if for an ordinary oxyphosphate cement until of the consistence of hard putty, when it is inserted in the cavity, to which it readily adheres."

Dr. Roussel also said that he had been employing this method for six months, and finds it very satisfactory for frail and deciduous teeth. It sticks to the cavity, and does not wear away very much.

Dr. ROBINSON, of Bordeaux. I have been using amalgam and cement in combination for fifteen years in another way,—mixing

the amalgam first, then the cement in the usual way and uniting the two while soft. After a time the cement wears out, leaving a roughened surface of amalgam, but it resists beautifully and is very useful, as in cases where a broken-down root has to be pivoted, using the combination to fix the platinum cap. It is sticky, and clings to the wall of the cavity, and lasts three to five times as long as ordinary cement alone. I do not confine myself to one kind of cement.

Dr. DU BOUCHET. As the amalgam sets in two hours, there is ample time for mixing up the cement, which, when the two are united, becomes absolutely black.

Dr. I. B. DAVENPORT. I have not used the combination as long as Dr. Robinson, but my experiences are identical.

Dr. DU BOUCHET. In what cases do you prefer to use this combination?

Dr. I. B. DAVENPORT. When there is very little retention to be obtained without danger of exposure of the pulp; and especially in deciduous teeth, on account of its stickiness. It lasts longer than cement alone, and conducts thermal shocks less to sensitive teeth. It enables one to contour these otherwise difficult cases quickly.

Dr. DABOLL. Does it not waste away?

Dr. ROBINSON. To a certain extent, but it lasts longer than any cement alone.

Dr. MICHAELS. I think it a mistake to expect much from combination fillings of this kind. My observations are that the durability of any cement filling or combination with cement is dependent principally upon the chemical constituents of the saliva. However, there are several factors in the wearing down of cement fillings:

1. Mechanical attrition, as from mastication.
2. Molecular dissolution, due to the action of alkaline products of putrefactive fermentation of organic (albuminous) *débris*, which often accounts for the wearing away at the gum line or cervical margin of the cement.
3. Molecular dissolution in alkaline or acid saliva. In regard to this last mode of disintegration, an acid or an alkaline principle in the saliva having a stronger affinity for one of the constituents of the filling than is the affinity of these constituents for each other will cause disintegration of the filling.

For example, chlorhydrate of ammonia, which is found in the saliva of persons of the hypoacid diathesis, gives an alkaline reaction to the saliva and combines with the acid of the cement, disintegrating the compound. On the other hand, lactic acid or any other acid, if present in the saliva in abnormal quantity, may by substitution displace the phosphoric acid of the cement. Amylaceous and saccharine substances lodged about the teeth surely soon undergo fermentation, liberating acids which, as we have just seen, may be destructive to the cement.

Dr. ROBINSON. Do you think that ptyalin is the principal factor in the fermentation of starchy substances and consequent acid production in the mouth?

Dr. MICHAELS. Organic fermentations in the mouth may have

different characters, distinct one from the other. First, there may be fermentation due to germs,—bacterial fermentation. Second, fermentation due to the presence of the ferment ptyalin. The action of the latter may be illustrated by this experiment: I have taken pure ptyalin and pure glycogen (either alone giving a neutral solution) and put them in separate bottles containing distilled water, then connected the liquid in the two bottles by a piece of cord which formed a loop around and in contact with a chalk crayon. By capillarity the liquids came together at the chalk, which was dissolved away wherever touched by the cord. Does not this tend to show how decay of the teeth may occur even in an alkaline saliva and independent of microbic influences? As a result of overactivity of the liver a superabundance of glycogen may be found in the saliva, giving it an alkaline reaction; but upon coming in contact with the ptyalin which is always present in the saliva a reduction occurs of the glycogen, first to glucose and then to lactic acid, which unites with the lime of the tooth, just as we have seen the crayon dissolved in the above experiment.

Dr. ROBINSON. How do you account in cases of typhoid fever for the eating away of the cervical border of the tooth sometimes to such an extent that you will find tiny bits gone all the way round?

Dr. MICHAELS. This is due to the action of lactic acid, its origin being the milk diet to which typhoid patients are confined.

Dr. ROBINSON. I think from the *résumé* of Dr. Michaels's remarks it would be better to place a layer of amalgam at the cervical border of cavities about to be filled with cement.

Dr. DU BOUCHET. This discussion is very interesting, but I think we are getting away from the subject.

Dr. BURT. I have used amalgam and cement combined for fifteen years. If you burnish the mercury to the surface these fillings will last three years longer than the ordinary plastic fillings. Burnishing is a great point in the durability of these fillings.

Dr. ROBINSON. These fillings are dark at first, but when set are lighter.

Dr. DABOLL. I recommend a chloroform solution of Canada balsam as a varnish to protect cement fillings for the first few hours, and also for sensitive cavities.

Dr. I. B. DAVENPORT. Mr. Baldwin, of London, combines cement and amalgam in another way. He partly fills the cavity with cement, and while it is still soft drives amalgam into the cement, finishing the filling with amalgam, but taking care that no cement comes to the surface of the filling or to the edge of the cavity.

Dr. DU BOUCHET. I have started amalgam fillings in cement, and gold fillings also, and I think the cement quite a help at times.

Dr. SPAULDING. So far as my experience goes, the American cements do not last well at the cervical border, but my cement fillings made of such cement as Poulson's last *better* at the cervical border than at any other point; it is the grinding surface that gradually wears away, but the cervical portion remains intact.

Dr. DU BOUCHET. My experience would tally with that of Dr. Spaulding.

At the February meeting the subject was continued by the paper, which here follows, by Dr. FIELD ROBINSON, of Bordeaux, entitled

MIXED OR COMBINATION FILLINGS.

The object of my paper will be to bring to your consideration some combinations of metals and plastics, and metals, which simplify the *modus operandi* of gold fillings, and which have the beneficial properties necessary to arrest effectually and prevent extension of decay, while being within the grasp of ordinary skill.

Some of you can remember when fillings were either all non-cohesive or plastics. All of you can remember when cohesive fillings were the rage; to-day the man who confines his practice to either extreme may be said to be a one-sided dentist. We seem to have found the middle ground in this department, and are doing our patients better service than before. For our purpose to-night I will confine my remarks to the combinations of—1. Gold and amalgam, the gold being placed directly in contact with the amalgam while still soft, as well as amalgam allowed to set and gold subsequently added. 2. Tin and gold. 3. Cement and amalgam mixed together. 4. Cement as a lining, and while soft the impacting of amalgam.

Now the question arises, first of all, when and where should one expect to derive the greatest advantages of combined fillings over others? Under what circumstances should they be employed? My reply would be: In those poor, soft, chalky, frail-walled cavities bearing evidence of rapid decalcification. These cavities, or some of them, may have been previously treated by fillings of gold, introduced by ourselves or others as scientifically and as carefully as circumstances would permit, yet which proved decided failures. Other cavities of this character may have once been filled with oxyphosphate of zinc, but in the course of time had succumbed to the agents of dissolution, leaving borders undermined and unprotected. Perhaps gutta-percha had kept some of the cavities securely, but finally yielded to the force of attrition and but a fragment remained; and when amalgam had been tried discolored margins revealed its presence and the story of a leaky filling with the mischievous intrusion of decalcifying fluids which perhaps destroyed the vitality of the organs or nearly ruined the integrity of their structure. You are well aware of the rapidly increasing weakness of the enamel borders as we approach the cervical line, and how much danger there is in such places in too heavy pressure or the use of the mallet. It is here where the virtues of a filling-material indestructible in its nature, and which, while permanent, makes a perfect joint, going into nook and corner without unnecessary strain on the weak walls, is most valuable. You have noticed without doubt that the most frequent point of failure in gold fillings placed in approximal cavities between bicuspid and molars, or between molars, is the cervical border, and also you have noticed

that the general point of failure in large compound amalgam fillings is around the edges on the occlusal or grinding surface from which it seems to shrink. Now, if an amalgam filling has been properly packed this space will be found not to go more than one-third of the depth of the cavity, and if you decide to cut the entire filling out, as I have done many times for my own special edification and instruction, you will usually find the cervical edge perfectly intact.

Now, gentlemen, in choosing the middle ground of which I spoke to you a few minutes ago we discard the bad and keep the good of the two materials, and produce a filling which, while insuring an enormous saving of time, affords us the opportunity of getting perfect results.

My attention was first called to the possibility of uniting amalgam while soft with gold by some clinics given by Dr. Register, of Philadelphia, in 1883, at the University of Pennsylvania.

Dr. Edwin T. Darby says: "The combination of gold and amalgam in the same cavity, or brought in contact in the same tooth, is generally attended with pleasing results. Thirty years ago (Dr. Darby's paper was read in 1894) such a combination would have been thought bad practice, but since then we have learned wisdom; and among other things we have learned, if we do the opposite from what we were taught, then we obtain the best results." The contact of amalgam with gold already in the tooth will produce a perfect union or joint with no after contraction or bulging. Dr. Benjamin Lord, in a paper read before the New York Odontological Society in May, 1893, said: "For some reasons I do not claim to understand we find that when amalgam is put in by the side of gold in cases where decay has extended beyond the gold filling it does better, it changes less in the way of shrinkage, and the margins are maintained much more perfectly than when amalgam only is used."

For the sake of brevity we desire to direct your attention for the moment entirely to the filling of compound cavities as we find them in the class of weak, frail bicuspid and molar teeth with the combination of amalgam and gold, with the understanding that the grinding surfaces of these fillings are to be made of cohesive gold. I do not need to describe to you the preparation of the cavities further than to say that the borders should be cut away till we have as strong and even walls as possible, with a groove cut along the lingual and buccal walls and the base of the cavity. The cervical wall should not be beveled off, but left as square as the case will permit without making sharp angles, thereby giving the filling a firm foundation to rest upon. We should get the chief anchorage for our gold at or near the grinding surface and in the fissures. It is absolutely necessary with this kind of filling to use a matrix of some form or shape, whatever kind best suits the operator. In my opinion the matrix should be so adjusted that it will give a little, so that the filling may slightly overlap the borders. Now we proceed to fill as our judgment may direct, first with amalgam (of your favorite brand), one- or two-thirds of the approximal part of the cavity, then laying on crystalloid gold or pellets until all the mercury

disappears and we have a clean gold surface. Personally, in the anterior approximal cavities in the two upper bicuspid or the first molar, I usually fill the cavity with amalgam two-thirds full on the lingual side and one-third only on the buccal wall, so as to prevent any inconvenience from discoloration.

The amalgam is mixed to an ordinary consistence; I break the mass into halves, use one half as it is, burnish well into place, and then add the second half, from which has been squeezed out all the mercury possible. This when placed on the first half absorbs the excess of mercury, and equally distributes it through the filling, leaving enough mercury to thoroughly attach the first few layers of gold. These disappear completely, and little by little the mass becomes harder and harder until the gold predominates and the whole becomes as if a complete gold filling. I usually do but one cavity at a time, and prior to withdrawing my matrix fill the adjoining cavity with gutta-percha; then, when the matrix is taken away, with a warm instrument make the gutta-percha touch the gold in the freshly-finished filling, thus preventing the space from closing and giving me ample room at the next sitting to polish the previous operation.

This system is also most useful in crown cavities when there are strong overhanging walls. The amalgam gets into all the corners, and, the gold absorbing the mercury, a most dense and compact result is obtained.

A modification of this plan as advocated by Dr. Clapp is to fill one-third of the approximal part of the cavity with amalgam, allow this to harden, and fill with gold at the next sitting, having polished the amalgam prior to putting on your dam and commencing with gold. The advantage of this modification is most apparent when the cavity does not afford you the opportunity of making good, solid points of retention in the fissures or occlusal surface. Such solidity can easily be obtained in the making of quite a series of retaining points and pits in the hardened amalgam.

Is it necessary, gentlemen, that I should do more than simply refer to that most useful and splendid combination of tin and non-cohesive gold foils? I think not, inasmuch as it has already, I believe, been brought to your notice; but I cannot help saying a few words nevertheless, while apologizing for encroaching on your time and patience. The preparation of the cavities is as before. The material is formed by putting one sheet of No. 4 or No. 8 tin foil between two sheets of Abbey's No. 4 or No. 8 gold foil, cutting these into three strips and rolling each into a cord, then cutting off pieces according to your judgment. This should be introduced by hand pressure, using instruments with rather sharp and coarse serrations, only using the mallet when a certain amount of gold and tin is in place and simply to assure condensation and solidity. Two-thirds of the approximal part of the cavity should be filled with this, and the lower third and the grinding surface with cohesive gold. It is good practice prior to commencing your cohesive gold to scrape with a sharp instrument the surface of your tin and gold, and be sure of perfect cohesion of your first three or

four pieces of cohesive gold. The gold seems to disappear in this combination, and the material works like velvet and is particularly easy of manipulation and quite good-tempered, one might say, in its conduct. After a certain length of time, say, one or two years, if you examine attentively your filling you will find that the combined tin and gold has quite a blackish hue, but the tooth itself is never stained, and that soft, velvety quality has disappeared, the mass being as hard as amalgam and in no way disintegrated. Its value as a therapeutic agent is immense, and it considerably reduces the severity of thermal changes. Its presence hardens the tissues wonderfully, and it is difficult, if not impossible, to separate it from the cohesive gold.

Dr. Moyer, in his paper on "Combination Fillings," read in 1897, says that tin and gold combined is the only filling that may probably exclude bacteria. Any moisture in the soft dentin oxidizes the metal, and stannic oxid fills the tubuli, preventing the production of caries.

In your discussion, gentlemen, I will leave this matter to more able hands than mine, as I know that some of you can speak from greater experience than mine, and also with different methods of manipulation.

The next mixed filling to which I wish to call your attention is the combination oxyphosphate of zinc and amalgam. As we had a most interesting demonstration given by our worthy secretary at our December meeting of the mixture of amalgam and oxyphosphate fillings, the two being together, I will simply name them and pass on to the lining of the cavity with oxyphosphate and working into it while soft either amalgam or gold. When called upon to treat that class of teeth in which we find soft, leathery disintegration of the dentin, and when the cavity is prepared for filling we have a thin and transparent wall of enamel only on the buccal and lingual sides, it is sometimes quite difficult to know what to do for the best salvation of these teeth; much more so when, as has often been my lot, you are hampered by parents who insist on gold being used, and who object to the use of amalgam on account of their having seen teeth stained, probably by old copper amalgam, and dreading such an occurrence in the case in hand. Now, here we have a few serious features to consider.

Dr. E. A. Boyce, of Chicago, in speaking of the value of lining cavities with cement for gold fillings, says: "In a tooth of poor structure we sometimes find a beautiful gold filling, with apparently perfect margins, but the color of the tooth shows extensive decay around the filling. With a cement filling the same condition would not be expected, but the dissolving or wearing away of the filling might be found. Cement will many times arrest decay in teeth that seem to melt away from gold like chalk. I can think of no reason why there should be a recurrence of decay in a properly prepared cavity under gold as cited any quicker than under cement, unless it be that softened dentin, or that the tubules, will allow sufficient moisture to gather under the metal filling, but the tubules being perfectly sealed under the cement filling the moisture is excluded.

If the margins of a cavity filled with cement that adheres to the walls break away, the moisture does not follow the joint between the filling and the dentin, but will penetrate as far as the fracture extends. This is a great advantage, as it prevents decay in the deeper portions of the cavity until there is an opportunity for repair. On the other hand, how many times do we find that a small break in the margin of a cavity filled with gold or metal has allowed the moisture to follow the joint by capillary attraction, and decay following in the deepest parts exposed the pulp in a very short time?"

Dr. W. S. Simminton, of Cameron, W. Va., in his article, published in 1893, "On the Making of Tight Joints with Amalgam," says: "The line of contact must be such that the secretions of the mouth or any substance whatever cannot pass between the walls of the cavity and the body of the filling. No standard amalgam properly manipulated is porous, and if any substance enters a cavity filled with it and causes decay it must be so through the joint or line of contact of the material and tooth-substance. Perfect union in soft and friable teeth in approximal cavities is particularly difficult to maintain, but this can be obtained by the old mechanical resort of introducing a third and different body between two other bodies to assist in joining them, as gum packing in steam or water joints, or glue between two pieces of wood. This third or intervening body is cement, and, used in the following manner, is the best method of making amalgam fillings without the inconvenience of discolored the frail walls left to view."

Dr. Simminton says that he had used this combination for five years, and had not seen a failure.

Mr. H. Baldwin, in a paper read before the Odontological Society of Great Britain, says that he began his experience in lining a cavity with cement, and while the cement was soft filling the rest of the cavity with amalgam, thus combining the real advantages of both materials without the disadvantages of an intimate mixture of them both, in large crown cavities practically sticking the amalgam in with the cement. Being pleased with the results, he extended this system to all varieties of cavities which he would previously have filled with amalgam alone, or in some would even have used gold. After fifteen years of experience he says, "This position I maintain."

Now, gentlemen, allow me to give you the manner of working this combination. In preparing your cavities it is not necessary to cut so freely as for filling with all gold or tin and gold. Thorough excavation of all corners and overhanging edges should be carried out, but they can be left with perfect impunity, as every little space will be absolutely filled with this material. The cavity should be thoroughly dried, and the dam always used for approximal cavities; it is preferable to mix your amalgam first. This should be done so as to have an ordinary soft mixture, half of which can be thoroughly squeezed so as to expel the excess of mercury. Then mix your cement, not too stiff, as far as consistence is concerned, and the cavity is half-filled with the same; place immediately the

softest amalgam in the center, and with burnishers or any suitable instrument push this forcibly into the cement, working it toward the edges and cervical border. During this process the cement and some amalgam will be forced out of the cavity. The edges should then be thoroughly cleared of any excess, using for this purpose spoon excavators for the cervical borders and hoe-shaped excavators for the sides, until the enamel stands quite free of any cement or amalgam. Then pack on your second half of expressed amalgam and finish as usual, either pushing with amadou or bibulous paper, according to the well-known method of Dr. Bonwill. Prior to putting in this second half of amalgam, it is good in approximal cavities to use a matrix on which you have a slightly smeared surface of glycerin or vaselin, so as to prevent any sticking when once this is withdrawn, and also to prevent the cement from getting exposed at any of the edges; but this matrix should not be placed before the edges have been properly cleaned, and in doing this I usually cut into the mixture of cement and amalgam small grooves or undercuts, so as to doubly secure the retention of the amalgam. This method allows one to assure patients of the non-discoloration of the thin walls of enamel, and makes a thoroughly tight and adhesive filling.

Dr. Baldwin makes the following comparisons, point by point, with gold or amalgam:

1. It requires a much smaller sacrifice of healthy tooth-substance.
2. It leaves a stronger tooth.
3. It necessitates much less pain in excavating.
4. Valuable time is saved in preparing the cavity.
5. It interposes a non-conducting layer between the sensitive dentin and the metal.
6. It adheres to the cavity.
7. It is water-tight.
8. Compared with amalgam, it does not stain the tooth, nor show through the thin enamel an objectionable color.
9. It is quicker than amalgam when the latter is inserted with due care.

Dr. Baldwin also claims it is sometimes difficult to thoroughly pack cement tightly against the cervical portions of a deep cavity, but that by means of the amalgam the cement is driven well home.

I pass over the placing of gutta-percha at the cervical borders and using cement for the rest of the cavity because, first of all, I have already occupied too much of your time, and, secondly, that that method can be considered to give only temporary results.

Discussion.

Dr. DU BOUCHET. I find objections to the use of oxyphosphate in any cavity of a tooth having a living pulp without the use of an insulator, such as a varnish of gum copal or Canada balsam. We all know the irritating action of the phosphoric acid upon the pulp through the tubuli. Another objection to the use of the oxyphosphate against a thin tooth-wall, without the intervention of a suitable coating of varnish, is the gradual change of color of the enamel due to the action of the phosphoric acid.

We can hardly consider the use of amalgam now in the same light as it was considered years ago. Then feeling ran so strongly against it that dental societies took measures of expulsion against members who persisted in employing amalgam. Now, the care and precision with which amalgam is made, as well as the careful manipulation of it in the teeth, produce very different results from those obtained when one of the maxims of many dentists was that "A tooth worth filling was worth filling with gold." I have seen extraordinary results obtained with the ordinary amalgam of half silver and half tin, manipulated as advised by Dr. Bonwill.

Dr. SPAULDING read a paper previously read before the American Dental Society of Europe, entitled "Dental Education and the Situation in France." It was decided not to publish this paper, but that a copy be sent to the Foreign Relations Committee of the National Association of Dental Faculties, and also one to the Committee on Dental History of the National Dental Association.

Dr. WM. S. DAVENPORT had seen a patient coming from the hands of a well-known dentist practicing in Italy, in whose teeth it had been necessary to use a great deal of gutta-percha. The gutta-percha had been much protected from the wear of mastication by partial facing with amalgam.

Dr. DAVENPORT also gave a clinic showing how to employ amalgam in such cases in such a way as to prolong the usefulness of the gutta-percha upon the grinding surfaces. After the gutta-percha fillings are made holes are punched into them with a hot instrument, and amalgam is packed into the holes.

He considered the method applicable to badly broken-down teeth, and particularly the deciduous teeth.

At the meeting of March 3, 1900, Dr. HOTZ, of Paris, read a paper upon

PYORRHEA ALVEOLARIS.

First giving a short *résumé* of the different theories upheld by various authors, and after presenting some of the conflicting opinions, he asked:

Is the origin of the disease a microbe, or is it due to a special constitutional diathesis? The greater number of authors appear to rather favor the former as the cause, but practical observation only would lead me to believe that both factors are involved in most cases.

At any rate, we know practically that pyorrhea alveolaris can be successfully treated, and, if not always cured, comfort and great relief from suffering can be obtained. Moreover, I believe that by judicious treatment all cases can be cured unless necrosis or absorption of the apex of the root has already set in. Numerous are the cases in which I have obtained satisfactory results, which have been more or less permanent in proportion to the care given by the patients as regards local and general hygiene.

One case, the worst I have ever seen, has been under observation fifteen years. When first seen, in 1885, there was not one tooth in

the mouth from around which, when the gums were pressed upon, more or less pus would not ooze up. All the front teeth, above and below, and the first molars were particularly in a bad condition. The patient was desperate. He had consulted several dentists, and one had told him that the disease would only end with his death. Some prescribed washes, etc., but without success.

I began with a thorough removal of the calcareous deposits; the scaling took several sittings. Then I washed the sockets with hydrogen peroxid, and applied aromatic sulfuric acid upon cotton threads, well introduced with fine probes. I repeated the application every third day for one month. The result was simply marvelous, excepting for one left upper first molar with the palatal root almost entirely denuded; this I decided to extract, and upon examination found the palatal root necrosed. Since then the gentleman calls regularly every other month, and I make a slight application of silver nitrate now and then. No other tooth has been lost, and, though the gums have somewhat receded in many places, the disease has not returned, and the patient feels very comfortable and grateful. Through my suggestion, the patient has had his urine examined several times, and he has been told that it contained neither albumin nor uric acid.

I have treated a large number of patients likewise, and with fairly good results. In many cases there has not been the slightest return of the disease for many years; others need attention now and then.

Any number of remedies have been recommended for the treatment of pyorrhea, such as sulfate of copper, pyrozone, green iodid of mercury with glycerol, silver nitrate, trichloracetic acid, sulfuric acid, and last, introduced by Dr. Younger, the pure lactic acid. I have used them all in turn, as they came to my knowledge, but in bad cases always came back to the aromatic sulfuric acid, as in my hands the result obtained by it seemed the best.

Following the paper by Dr. Hotz,

Dr. W. J. YOUNGER said: The paper by Dr. Hotz is a good one and modestly written. I congratulate him on the success he claims to have attained in the treatment of pyorrhea, and upon his efforts to thoroughly remove the deposit as a "*sine quâ sure*" to its cure. It is no doubt to this fact that he owes the success he has met with; but he seems to have made no attempt to restore the union between the soft tissues of the alveolar walls and the root of the tooth, which to my mind is second in importance only to the thorough removal of the incrustation. It is in consequence of this that he has to continue the treatment of the gums at regular intervals. The use of powerful caustics, like sulfuric acid, silver nitrate, trichloracetic acid, etc., that have been so generally used in the treatment of pyorrhea I cannot approve of. While they may have a wholesome effect upon the soft tissues, where the circulation is abundant, in reducing their congested condition, they have a deleterious effect on the surface of the root, where the circulation is not appreciable, and destroy the possibility of effecting union between the walls of the alveolus and the substance of the tooth. The pyorrhea may be cured, but unless the tooth is granted the

support of the environing walls its utility as a masticating organ may be entirely destroyed. At any rate, unless this union can be induced, and the physiological conditions established that prevailed before the invasion of the disease, a pocket is left for the reception or accumulation of food and other detritus to perpetually invite the reinduction of the pyorrheal trouble.

If the doctor was not successful with lactic acid, it was probably owing to one of two reasons: either he had not been thorough in the removal of the deposit, or he had not properly applied the acid. I think the first is the more likely, for the perfect removal of the deposit in advanced cases is by no means easy, and requires a keen sense of touch, perfect patience, and much practice. Now, I do not for a moment question that the essayist has all these qualities, but I know from long experience that with a large general practice it is impossible to give to the treatment of this disease that study and attention and to secure the development of that peculiar and delicate touch which the successful treatment of pyorrhea requires. The handling of plaster and vulcanite, the swaging of plates, the molding of crowns, the filling of teeth, and the manipulation of the instruments and appliances that constitute the occupation of our profession are all opposed to the cultivation of that delicate sense of touch required in locating minute particles of the incrustation, the removal of which is just as essential as the dislodging of the larger portions. Time is a necessary factor in the removal of the deposit. You cannot hurry your movements as in the other mechanical processes of our art, because you have not the sense of vision to assist you, and, besides, the additional energy that increased activity requires is opposed to that tranquillity in which the sense of touch is most efficient. You cannot be patient in a hurry, and upon this perfect patience and this delicacy of touch the cure of pyorrhea, in my opinion, largely depends. It is on account of too much haste probably that the profession, especially those driven for time by a large practice, have been unsuccessful in the treatment of pyorrhea.

In regard to the instruments, I find that the feeling of steel or iron affects the sensibility of the touch; at least, it does mine, and so I have the handles of my instruments where the power is applied coated with sealing-wax, and my indicator is entirely covered with it; and even through this sealing-wax I find a difference in the indicator if the point has a high temper. There are many other matters in connection with instruments which experience has taught me, but it is not within the limits of this discussion to narrate them.

As to the etiology of pyorrhea, my experience with it has thoroughly impressed me with the conviction that it is purely a local disease, one powerful reason being that it is cured by local treatment only. If it were systemic or an expression of a constitutional disorder, as the vast majority believe, then this local treatment would be merely palliative, and systemic treatment would be required. Any constitutional cachexia or disturbance that vitiates the nutritive functions of the tissues or lowers their vitality affects, as a matter of course, the inception and progress of pyorrhea, but

that it in any way *causes* the disease I do not believe. Professor Peirce, I think, has been misled in attributing the formation of the pyorrheal deposit to a gouty diathesis because of the finding in this substance a certain percentage of uric acid salts. But when we consider that in the breaking down of tissues, in the disintegration of the proteid molecule, uric acid salts are always a result, we cannot be surprised at finding them in the deposit of pyorrhea. Moreover, pyorrhea is as common and virulent in those not having the gouty diathesis as in those afflicted with it, and also the treatment is as effective in arthritic subjects as in those who are not. I believe the disease is bacteriological, the inception being traumatic, due to the lodgment of seeds, insoluble particles of food, or other irritants in the fold of gum surrounding the cervix of the tooth, whose pressure produces a depraved condition of the alveolar margin, and so becomes a nutriment to a certain micro-organism, a regular habitant of the mouth, which thus finds the means of attacking the alveolar structure.

In eight tests we found a bacillus not heretofore described to my knowledge, which I think probably is the specific bacterium of the disease. Of course seven out of eight tests is thoroughly inadequate to prove that the micro-organism of pyorrhea has been discovered; a very great number of tests will have to be made with similar results before we can state with any degree of certainty that this is so,—nevertheless it is enough for an indication. The deposit has certainly every evidence of its being of bacteriological formation.

I. B. DAVENPORT, *Editor*.

THIRD PAN-AMERICAN MEDICAL CONGRESS—DENTAL SECTION.

ON February 4, 1901, the Dental Section of the Third Pan-American Medical Congress, held in Havana, assembled and commenced its work, the sessions to continue until February 7, the time fixed for the closing of the Congress.

The acting president of the Section was Dr. Erastus Wilson, a long-time resident dentist of Havana, who opened the meeting and congratulated the assemblage, expressing regret at the same time at the non-appearance of *confrères* from the United States who had signified their intention of coming, and the hope that at the next meeting (on the morrow) the steamer announced might bring some brother D.D.S.

The local dentists included Drs. Betancourt, Calvo, Justiniani, Madan, Marichal (from Costa Rica), Mascort, Perez, Polo, Rivas, Rojas, Weber, father and sons, Wilson, Weis, and Yarini.

The president of the Section, Dr. Erastus Wilson, read the following paper:

SOME CONSIDERATIONS AS TO THE DENTAL OUTLOOK IN CUBA.

It is hoped and expected that the aurora of the twentieth century will awaken many innovations in the island of Cuba. Among

others, we for the first time are making efforts toward organizing the profession of dentistry upon a scientific basis.

Hitherto, although a limited number of dentists who have had the advantage of a scientific training in the United States (mostly Cubans) have been practicing here, the vast majority have been working at it as a handicraft or trade, which from their point of view requires little time for preparation in order to acquire the slight knowledge and skill of their teachers,—who had obtained their own preparation in the same way. Indeed, several of these teachers had not dental patients, or had very few; they gained their livelihood by the fees paid them by their pupils and by the transient public attracted to them by their skill in advertising and in obtaining authority from former venal governments to dispense diplomas as part of their business. The island is now pretty well stocked with diplomas of this origin, whose possessors offer the public cheap prices, in correspondence with the quality of their services.

These chaotic conditions are to be principally charged to the account of the deranged and disorganized state of society, due to two destructive wars and the complete breaking up of our former social system,—the final destruction of the antique molds in which society was cast, and the sudden annihilation of our former wealth, which had been developed by the forced labor of human chattels.

These disastrous cataclysms disjoined everything here, and in the resulting chaos many of the unemployed caught at every floating straw that seemed to offer them a means of living; and many no doubt believed that by a short tuition in the aforesaid extemporized schools of dentistry they could acquire a profession that would bring them wealth, while to learn any other trade several years would be necessary in order to attain the required skill. Thus, from the influx of all this class of recruits to our ranks, our calling takes a lower grade than any other handicraft or trade. Under these circumstances it need not surprise any one if many of these recruits are illiterates of low class, or that the majority of those of our calling in this island are not capable of exemplifying the best service that our modern profession is able to give to the public.

As it is always the majority of any profession or art that determines its social category, it must be the persistent effort of the better class of our members to multiply their proportional numbers by a higher class of recruits,—and this, fortunately, our new scheme of public instruction somewhat favors. In it dentistry finds a place in the official curriculum of the University of Havana, although it is there represented by only two professorships, and the selection of these two professorships has been considerably controlled by antique habits of thought formed under the old influences, and of an insane chauvinism or race jealousy here still extant. Although there are here several Cuban dentists well qualified for professorships, with diplomas from some of the leading American dental colleges, who were available and desirous of occupying them, none of these were given the most important of the two professorships in our university.

We may, however, consider it one step in the right direction to

obtain a place for our art in the university classes. It is presumable that it will guard the door to our profession, which has until now been wide open to all comers, however illiterate, who could produce a few five-dollar pieces of money as a key to the situation. Some literary qualifications will henceforth be required, and a less number of abuses will creep in. But the dental class as now organized in our university will not be able to graduate competent alumni, compelling them as it does to acquire in the regular medical classes the fundamental elements of medicine; this alone will not fit them for practice as dentists. If it were so, then every regularly educated physician would be a dentist of competent skill. A few hours each day in the interval between the medical classes dedicated to the dental operating-room clinics and the mechanical laboratory are not sufficient preparation for dental practice.

Our specialty is eminently a branch of preventive medicine, both in its operative and prosthetic aspects. But although our students should be well grounded in the elements of general medicine and in the special buccal pathology and therapeutics, by far the major part of dental service to society is dedicated to the conservation of the natural organs and the construction of efficient and artificial substitutes for such of the dental organs as may have been lost by want of proper attention to their care. A proper education in these practical parts of our profession can only be acquired by several years of constant clinical exercises under skillful instructors.

Dental education has been organized in the Havana University by authorities not connected with our specialty, and, so far as I know, without consultation with any of its members. But I regard it as one step toward a proper organization of our profession here for which we ought to be duly grateful, and we are in duty bound to give it moral support, with persistent recommendations at the same time for a better organization. My own idea is that at least two years of previous technical training in the laboratory of some well-known dentist, with a certificate of proficiency, should be one of the requirements for admission to university classes.

Thus the twentieth century opens with encouraging prospects for our island in all its aspects, and imposes upon us serious obligations to the fundamental laws of human progress. It is our solemn duty to organize associative scientific efforts to generalize in the public mind a knowledge and appreciation of higher standards of excellence in dental operations and honorable professional dealings, in order that our art may attain the legitimate social position to which its merits entitle it.

We are now face to face with this prime necessity, and in our first steps in its direction we meet with a grave obstacle that must be reckoned with. It is that horde of intruders with no sufficient instruction nor regular training, many of whom are in possession of the certificates and diplomas above referred to, and to which I attribute scant scientific significance, but on the authority of which they claim to be members of our profession. We have here a certain number, an increasing number, of competent dentists, who yet fear to organize themselves as such in contradistinction to

those referred to, lest they appeal to the excitable chauvinism or *patrioteria* which is now rampant in our island. In the social organization of our profession here, must we accredit these irregulars with the public by recognizing them as our fellows while all their operations and their current public advertisements are discreditable to us as a profession? Would such a recognition advance our professional credit? Would it not rather be a public acceptance by us of the low standard of excellence propagated by these persons? Science knows no political limits, but here political and racial jealousy occupies a menacing attitude unless we assume a conciliatory tolerance of the vestiges of the ancient *régime*.

What appears to me a practicable solution of this difficulty is the following, viz: All those at present among us who have had a scientific training in our profession have obtained it in American colleges, consequently must be well grounded in the English language. And although dentistry has now a place in our university, several years must pass before it can graduate its alumni,—this without consideration of its infantile and imperfect organization; therefore, we may organize in two separate dental societies, one English-speaking and the other Spanish-speaking, so that one may in no way antagonize or interfere with the proceedings of the other. In this way there would be two distinct categories which would operate as a constant stimulus to those of one category to attain a competent degree of culture to enable it to secure recognition and entrance into the other, thus tending toward a continuous improvement in our merits and in our social standing in this community. We have now a sufficient number of American graduates here to assure the rapid generalization of the greater portion of the better class of dental work, which would soon raise the credit of our profession in the general estimation and gradually force the "cheap Johns" into the background.

This Pan-American Congress will surely mark the inauguration of a new era here,—social, professional, industrial, and agricultural. Let us perform our part of the social obligation to this new era, associating ourselves in organized form in order to facilitate and strengthen our efforts in fulfillment of this social duty, until we shall have accredited ourselves both with our inner consciousness and with society outside, and rise in the social scale while commending the better class of dental service at reasonable fees,—which, however, must ever be more or less graduated to correspond with the financial ability of each patient, as this is both reasonable and honorable. Raise the quality of dental work, and prices will raise themselves to the highest limits of the appreciation and the financial ability of each client.

Among the other papers read, those that attracted the most attention were those of Dr. Weber, on "Immediate Extirpation of the Dental Pulp" and "Dental Hygiene"; Dr. A. C. Betancourt, on "Glycerin as a Vehicle in the Treatment of the Roots of Teeth," and that of Dr. A. E. Mascort, "An Apology for Salol."

Of the absent members, Dr. Eugene S. Talbot sent two papers,

one on "Treatment of Interstitial Gingivitis," which was read and highly appreciated by the members, and the other "The Intervention of Therapeusis in the Irregularities of the Teeth."

Dr. M. D. Lederman's paper on "The Influence of Mouth-Breathing on the Dental Arch" was specially translated, and therefore was well discussed by all present, and Dr. Lederman's theory was accepted as well as unanimously approved.

Dr. Jefferson Griffith, from Kansas City, was present as delegate from the Kansas City Dental College.

A series of entertainments and excursions was an accompaniment of the Congress in which all participated, and which rendered the stay of the foreigners a most pleasant one.

MASSACHUSETTS DENTAL SOCIETY.

(Continued from vol. xlii, page 1032.)

THE next paper was that of Dr. R. W. HUNTER, of Greenfield, Mass., entitled

REPLANTATION—A CURE FOR ABSCESSED TEETH.

This is an operation with which I have had some small experience, though not enough to approach this convention without some trepidation. My method is simple, possibly somewhat crude, but has proved in all cases that I have attempted uniformly successful up to the present. What may happen to these replanted teeth in course of time I cannot say, but I hope for permanent retention. Before I describe the course I have pursued I wish to state that I look at the operation as allowable only as a last resort.

Perhaps there are many among you who never have a case of alveolar abscess that you cannot cure through the roots. I have not been so fortunate, or perhaps I have not the requisite skill.

My first case of replantation to cure an abscess was in June, 1895. The tooth was a left upper first bicuspid. I had treated the tooth for many weeks in hope of saving it, in spite of a sharp curve at the end of the root, and at one time had so far succeeded that I had attempted to fill the roots. Several weeks passed without more than a slight soreness, which I hoped would wear away; but again the pain became more intense, and I had the tooth in as bad condition as at first. I removed the filling and again attempted to treat, without success. In desperation I finally determined on extraction and replantation.

Administering gas, I extracted the tooth, cleansed it in a solution of listerine and water, cut off the curved portion of the root, filled the canals with gutta-percha and the tooth itself with alloy retained by cement; carefully washed the tooth-socket with listerine and warm water and replaced the tooth, which required some force. The tooth was quite sore for from seven to ten days, after which time the swelling and the pain gradually disappeared.

In July, 1897, the same patient presented herself with the upper right first bicuspid in much the same condition. This tooth had

been previously treated and the canals filled. In my endeavor to remove the filling from the canal the root was perforated. The tooth was extracted, and the same course pursued as previously, and with equally good results. Both of these teeth are at the present time firmly fixed in the alveolus, and are doing good service. The patient is a young lady of about twenty-two or twenty-four years of age.

The next case was one in which I had but small hopes of success, and of which I have not had any very late information (July 22, 1897). The patient was a woman of about forty years, of a lymphatic temperament, and quite stout. The tooth was the lower first bicuspid, which another dentist had treated, and trouble had recurred. On opening into the tooth and removing the cotton root-filling I found the root perforated. I attempted to open the canal beyond the perforation, and succeeded in making another. The tooth was extracted, and the former course pursued, filling the root and perforations with gutta-percha. Within two weeks the soreness had disappeared, and the tooth was comparatively firm. In February, 1899, I had the pleasure of seeing the tooth firmly fixed in place.

I will tell you now of a case which proved a failure, though I cannot give you the date of the original operation. I believe it to have been done in the year 1895 by an assistant in the office, on a tooth in the mouth of one of his relatives. This work I can happily claim was not mine, though probably the same result would have followed. The operation was seemingly a success, but after about two years had gone by the patient broke off the crown, and a Richmond crown was affixed. Within two years the tooth loosened, and was easily removed with an excavator.

The final case I shall mention is of recent date, and as yet I cannot say how successful it will be. It is the most unfavorable I have tried, and has been the most troublesome. The patient had lost the upper left second molar early in life, and the third molar, moving forward, had filled the space, though tipping forward slightly.

The tooth gave trouble, and I opened into it to do what I could to relieve the patient. The tooth had been treated, and I found the roots filled, as far as I could go, with cement. Fearing to perforate the root, I told the patient what I would advise, and on her consenting removed the tooth, cleansed it, and filled the roots from their apices. Other cases had been easily retained by a combination of rubber dam and silk ligature. This one proved more difficult, however, and I devised a wire ligature of annealed brass wire, which retained it tolerably well.

This operation was performed on October 27, 1899, and at present the tooth is as firmly fixed in the alveolus as it was previous to the operation, though it was not perfectly firm when it first came to my observation.

I do not know that there is more for me to add to this paper, except that in extreme cases I believe it to be a valuable method. I do not claim anything original in the method, and if this effort of mine should interest you so far that you will tell of some cases of your own I shall be amply repaid.

Discussion.

Dr. D. H. ALLIS, Springfield, Mass. There is nothing like speaking from experience. I have retained all of the teeth of my permanent set. When I was in Chicago, at the World's Fair, I had the misfortune to have a most terrible toothache. I had this aching tooth treated. It is the lower right first bicuspid. The root portion of it was very difficult to get at. The dentist treated the canal, and filled it with gutta-percha. I had to have that tooth treated on an average about once in six months for two or three years with no better results. I finally determined to see the end of that root, and asked my assistant to extract the tooth without breaking the crown. He did so. I found what we thought was the trouble; the root had a turn about one-third from the apex, and you could go so far and no farther. I took my engine and cut the bent portion off, polishing the end of the root round with cuttlefish disk and agate burnishers. I then filled the canal, first with oxychlorid of zinc, filling the end of the root with gold filling, and put the tooth back. That was done in 1896, and that tooth is doing me service to-day. Dr. Guilford put the gold filling in the crown when I was in college, and it is there to-day. I have never had any trouble with it, and expect it to do service until the root is absorbed away. I never have had to treat it locally. When it was done I held it in my hand for about one hour, put it back into the socket, and simply held it there a few minutes with my fingers. It was only sore for about two days. However, it is less painful to have a tooth out than to replace it.

Dr. W. I. BRIGHAM, South Framingham, Mass. I would like to ask Dr. Hunter what treatment he gives the socket.

Dr. R. W. HUNTER, Greenfield, Mass. I very carefully wash the socket with warm water.

Dr. D. D. PEABODY, Stoneham, Mass. I have had two or three experiences of that kind when it seemed from the nature of the case that replantation was the only resort. Two years ago this present month I had a case. The pulp of the tooth had been destroyed, and an attempt made to penetrate the root; I think it had been successful. Whether that was the first attempt or not I really cannot say. I am now aware that there was another attempt. In this attempt about one-fourth of an inch of broach had been left projecting. This had caused six abscesses in five years. I thought it might be relieved if I could make an opening through that root-canal. I attempted it and ran into the cement which was there. I dismissed the patient for a week, and when she returned the tooth was taken out and replaced in the socket and fastened with a wire. In two weeks' time I took off the wire, and the tooth became more firmly fixed than it was in the first place, with complete recovery.

Dr. A. W. TENNEY, Stoneham, Mass. My experience in replanting teeth is limited to three cases. The first two were done about twenty years ago. The patient was the wife of one of our physicians. She had been suffering severe pain in her teeth, and the doctor brought her to my office for advice. On examination I found the two upper left bicuspids involved; one was abscessed,

and the other approaching that condition. At that time there was considerable replanting of teeth being done by some dentists, chief among them being Dr. Coggsell, a Boston dentist, who died several years ago. The physician who brought my patient suggested that replanting be tried. I had no objection to trying the experiment. The teeth, which had large gold fillings in them, were extracted, washed in a warm weak solution of carbolic acid, the ends of the roots taken off a little, the pulp-canals enlarged and filled with gold, and the teeth returned to their sockets. They soon became firm and apparently healthy, and remained so for six years, when they began to give trouble. I found the process absorbing, and the teeth getting loose. I removed them and found the roots also wasting.

My third case was an upper right lateral for a young man. So much pain followed the replanting that it had to be removed very soon.

I will add that several years later this subject was brought up in one of our meetings, when Dr. Coggsell was present, and when asked what was the result of his experience in replanting teeth, he replied that most of them were in his drawer.

Dr. HENRY W. GILLET, Newport, R. I. My experience with replantation leads me to feel that it is a desirable operation in certain cases. There are two conditions that I am sometimes unable to handle as successfully by other means; these are blind abscesses in lower molars, and certain stages of pyorrhea. I do not consider replantation of value in the last stages of pyorrhea. The particular point I wish to suggest is the value of handling replantation cases as a surgeon does his surgical cases. If you wish to do surgery, provide yourself with the conditions that modern surgery requires; otherwise you entail upon your patient needless suffering and invite failure and criticism. If you wish to do replantation, I would urge the need for surgical cleanliness of your whole office.

Dr. B. H. STROUT, Taunton, Mass. My experience in these cases has been limited. I believe, however, from what I have seen that in the majority of cases there will be failure from absorption of the roots, sooner or later. I should say that in many of these cases the operation of election would be to cut through the process and amputate the apex of the root, rather than to remove the tooth entirely. It can be as easily done, with less pain.

ANNUAL CONVENTION OF THE SEVENTH AND EIGHTH DISTRICT DENTAL SOCIETIES OF THE STATE OF NEW YORK.

(Continued from page 189.)

SECOND DAY—*Evening Session.*

THE convention was called to order at 8 P.M., and Dr. H. J. GOSLEE, Chicago, read a paper on "Modern Ideal Crown-Work."*

Discussion.

Dr. F. J. CAPON, Toronto, said he could not take exception to anything that Dr. Goslee said in his paper, as their ideas and methods were as nearly identical as they could be if they had both been taught in the same laboratory. He was specially pleased that Dr. Goslee had dwelt so much on the word "art" as applied to prosthetic dentistry. Art seems to be almost eliminated from the work of many prosthetic dentists. The main idea seems to be to get at the dollars with as little real service as possible for the greatest reward in cash, and any effort toward art seems to be in their eyes unnecessary. There is no possible excuse for this kind of practice. It is just as easy to make even a gold crown imitate nature as it is to make it with straight sides. Dr. Goslee spoke of improving on nature; this is one step beyond Dr. Capon. He never tries to do more than imitate as closely as possible the natural appearance of the teeth which he is replacing. The user of porcelain must of course have discrimination. At the clinics in the morning he had been almost annoyed by some of the questions asked. We are not here to advocate the use of porcelain in all kinds of cases, but to show how it is to be used in suitable cases. He considered it a criminal act to put a gold crown on a front tooth. He spoke of a lady who came to his office to have other work done who had an all-gold crown on a first bicuspid. He persuaded her to let him replace it with a porcelain crown. Upon removing the crown he found a tooth that was perfect except a cavity of decay that could have been easily filled, but the face of the tooth and the cusps had been mutilated so that the gold crown could be placed upon it, and all this the dentist had done for the sake of the ten dollars he got for the crown. He feels satisfied that porcelain crowns are the most artistic and the most satisfactory crowns the profession have, especially for front teeth, and complimented Dr. Goslee on the beautiful, artistic, and durable crowns he had described.

There is one difficulty in making porcelain crowns for bicuspid; the deep sulci in these teeth weaken the crown. The only way is to have the crown go down below the margin of the gum; in this way you get sufficient bulk of porcelain to give the required strength. His method is to make what he calls the cup crown. A porcelain-worker will scarcely be at a loss for means to replace lost crowns beautifully and durably, and can save many teeth that a gold-worker would have to sacrifice.

Dr. GOSLEE said he appreciated the kind words of Dr. Capon. Praise from such a man was very gratifying. The point of the paper which he criticized, about improving on nature, was not understood. What was meant was to improve upon the abnormal condition. He objected to jacket crowns because with them it is not possible to have a sufficient bulk of porcelain to give the required strength. In a case where it was necessary to use a How crown his plan is to put a little porcelain tube into the crown and screw a dowel from the tooth down into this tube; this gives great strength.

There was no further discussion, and Dr. J. H. MILLINER, Buffalo, read the following paper:

ADENOID VEGETATIONS AND THEIR INFLUENCE ON THE
PALATAL ARCH.

Mr. President and Gentlemen: I will speak this evening upon a subject which a few years ago was scarcely noticed by the medical profession, but which is now considered a serious condition, although there are still many medical men who do not give it the prominence it deserves. This disease is the fundamental cause of many serious diseases, both general and local, and I think among these conditions, general in character but with local manifestations, may be found that pathological condition, the V-shaped arch with its irregular teeth.

Adenoid vegetations, or, more properly speaking, hypertrophy of the pharyngeal tonsil, is a normal hypertrophy or enlargement of the natural lymphoid structures found in the pharyngeal vault, whose existence has been recognized since the days of William Hunter. Czermak, in 1860, described a case of growths in this region, and in 1862 Sir Andrew Clark wrote a short article on "Naso-Palatine Gland Diseases." The frequency and clinical importance of these hypertrophies of Luschka's tonsil were, however, for the first time clearly insisted on by Wilhelm Meyer, of Copenhagen, in 1868. This accomplished specialist, with the record of one hundred and two cases, gave an admirable account of the symptoms and treatment of the condition,—called by him, as a result of microscopical examination, "adenoid vegetations."

Potiquet, in 1893, in an elaborate essay on the history of the disease and death of Francis II of France, showed that this monarch had suffered from adenoids, which were responsible for a putrid catarrh of the middle ear, leading to meningo-cephalitis, from which he died in his seventeenth year.

Meyer (1895), doubtless stimulated by this contribution, showed that adenoids did not constitute a new disease. This he did by a careful inspection of European galleries of painting and sculpture. He came to the conclusion that the portrait of Francis II of France confirmed the history given by Potiquet, and that Charles V and Ferdinand I of Austria were each the subject of adenoids, while among the statuary in the Vatican the figures of Marcus Antonius and three others were declared by him to come under the same category.

The disease is generally one of child life, developing in infancy, and probably not infrequently congenital. It thus begins, as a rule, before the bones are thoroughly hard and formed. Like other glandular hypertrophy or enlargements, these growths show a remarkable tendency to disappear, or apparently disappear, at puberty. This may be explained by a diminution in the size of the tonsils and a certain amount of shrinking which occurs in this peculiar form of growth at this age, and also by the fact that they occupy a relatively small space in the now more widely developed pharyngeal vault. The cause of the disease lies in that general disposition by which, in young children, a morbid process develops and has its highest activity in the epithelial and lymphoid structures which disappear at puberty. Heredity and a lymphatic tempera-

ment are undoubtedly the causes. In the locality which interests us the lymphatic tissue appears in an aggregated as well as disseminated form, and is distributed uninterruptedly throughout the pharynx and naso-pharynx. Its position is almost vertical, and, beginning at the vault of the naso-pharynx with the pharyngeal or Luschka tonsil, it extends to the orifice of the Eustachian tube, where we have a large aggregation of follicles, the tubal tonsil.

It must be remembered that these structures are normal to these parts; that in the normal healthy condition they are not visible to the eye, not even the faucial tonsil; and only when they become permanently enlarged as a result of disease do they become important factors in producing the many grave diseases of the surrounding structures.

Disease of these glands is found in all countries and in all climates in varying degrees, and there is much diversity of opinion as to the cause. There is no doubt that heredity, also rheumatism, syphilis, and kindred diseases play an important rôle in causation, enlargement of these glands having been observed in children born even before term. Bad hygienic surroundings, frequent colds, and neglected catarrh may also be considered as causes, or at least they greatly aggravate a case whose tendency is toward hypertrophy. It is of course a disease which manifests itself during child life. It is much more common than is generally supposed, and many cases which have sufficient enlargement of the glands to produce serious trouble, especially in the ears, do not manifest the marked symptoms supposed to be characteristic of the disease.

Symptoms and Effects.—First, the impairment of the normal nasal respiration, and mouth-breathing. In some cases these growths fill up the entire cavity, thus shutting off the air-passages of the nose entirely; at other times they partially close the air-passages, merely closing them entirely when the person is suffering from a cold or an acute coryza; a thick, toneless, or dead voice, the voice of one with a cold in the head; stammering and more or less stuttering, backwardness in study, derangement of spirits and energy, nightmare, snoring, teeth-grinding, disturbed sleep, and dry mouth and throat on waking; laryngeal and pulmonary troubles, disordered digestion, reflex croup. The old ladies are in the habit of saying that when the child grinds its teeth it has worms. This may be true, but it is sometimes certain that the child has adenoid vegetations.

The diagnosis is often instant, for the facial aspect is almost alone sufficient,—the open mouth, flattened cheeks, collapsed and dimpled alæ, widened bridge, and puffy and edematous root of the nose, down-drawn inner canthi, and the naso-labial furrow. The eyes are somewhat wide apart, and, although the children may be bright and intelligent, they have a more or less well-defined appearance of stupidity. The teeth are irregular and frequently diseased; the lips are pale and anemic, due to deficient oxygenation of the blood; the faucial tonsils are invariably enlarged; the child sometimes has great difficulty in swallowing, although at this time there is no evidence of a disease other than the conditions stated. There is

frequently an excessive discharge of mucus or muco-pus, the source of the discharge being undoubtedly in the diseased glands themselves. They are mouth-breathers, and it is a fact that the teeth of mouth-breathers, generally in the upper front row, are frequently dry; and it seems to me that the early dental caries common in these subjects is in some measure a result of the habit. As we all know, the teeth of men in their normal position are arrayed in a symmetrical order, side by side, their outline as a whole describing very nearly a parabola or semi-ellipse, their variations from these geometrical figures consisting principally in a slight flattening in the region of the incisor teeth and a tendency to angularity in the region of the canines, owing to the marked prominence of these teeth. As we know, irregularity as to their origin may be hereditary or acquired, the one resulting from causes operating before the birth of the individual or the eruption of teeth, and the other from circumstances during and attending their eruption or subsequent to it. The exact causes operating to bring about either of these kinds of irregularities are not as yet perfectly understood, but they are explainable to some degree by certain facts that are known, or by hypotheses that are very plausible. For instance, in respect to the hereditary feature, we know the tendency on the part of nature to reproduce herself, as we see the offspring resembling its parent in its dental organism, just as it does in form, feature, voice, and gait; or it may inherit some peculiarities from one parent and some from the other, thus embodying in itself the individualities of both. This being the case, if the parents be of different nationalities or different in size or feature, the one having large teeth and large jaws and the other small teeth and small jaws, it is very presumable that the child may inherit the small jaws of the one and the large teeth of the other, the disparity between the two resulting in crowding or malposition of the teeth from insufficient room to accommodate them. The acquired form of irregularity we know to be partly due, first, to the early extraction or the too long retention of the deciduous teeth; second, to accident; third, to improper habits, such as thumb- or lip-sucking; and fourth, but by no means least important, we have the enlarged tonsil.

Now, I do not wish to make the assertion that the irregular or V-shaped maxilla is caused entirely by the pressure of these growths upon the formed or forming superior maxilla. Nor do I wish to state that the pressure of the muscles of the jaws cause this deformity. These are plausible hypotheses, but I do think that all adenoid vegetations can or do cause a tremendous alteration in the facial expression, such as the atrophy of the antra of Highmore owing to the closing and disuse of the nasal passages. This, in connection with deficient oxygenation of the blood and the general sickly condition of the subject, has a tendency to cause an irregular arch as well as poor teeth. I think that before the teeth of a person from ten to eighteen years of age are regulated we should first ascertain that they are not mouth-breathers, and that there are no adenoid vegetations present; if these are found, they should be promptly removed. The diagnosis is simple, merely placing the

finger in the nasal pharynx. Almost anybody with but little experience can diagnose their presence or absence, and even without this the enlarged faucial tonsils and facial expression are sufficient. Of course there are still surgeons living who object to removing adenoids, as there are yet some who depreciate the removal of the faucial tonsils, on the ground that children will grow out of them. But it ought to be remembered that even if tonsillar hypertrophies do become reduced with advanced age, the subjects have in the meantime *grown into their symptoms*, and these are found every day in cases of deafness. The wide-awake dentists have an unusual opportunity to detect these symptoms and conditions, and with this opportunity comes a duty to add to their already useful vocation that of aiding parents to see the importance of subjecting their afflicted children to operative interference and freeing them from these conditions with their long train of attendant symptoms and serious results. Every advancement in the science of medicine and surgery, as well as every increase in knowledge and in efficiency in the individual members of the medical and dental professions, means the saving of human life and the alleviation of human suffering.

Discussion.

Dr. F. MESSERSCHMIDT thought the subject of Dr. Milliner's paper one of the most important to dentists, and one of the most neglected. He does considerable work in correcting irregularities, and in every case after getting models of the mouth made he studies the case in the endeavor to learn the cause of the condition. If there are adenoids he sends the patient to a specialist to have the adenoids removed, as he has learned that if they are not removed the irregularities will return. He told of two cases in which the effort had been made to correct irregularities, in both of which the teeth returned to their former positions; both cases had adenoid growths. Since then he refused to operate in such cases unless the adenoids were first removed. He had not expected to discuss this paper, but when he learned that there was a paper on adenoids to be read he looked through his notes and brought what he had.

In the "Text-Book of Diseases of the Nose and Throat," by Professor D. Braden Kyle, 1899, page 355, he finds the following: "The effect of impaired respiration due to post-nasal obstruction is also manifested in an ill-formed superior maxillary arch, with marked irregularity in the arrangement of the teeth. This irregular development is largely caused by the repeated contraction of the muscles controlling the nasal orifices, necessitated by the forced nasal inspiration and snuffing. By this drawing down of the facial muscles the upper jaw is retracted and the contour of the upper arch altered. The hard palate then, instead of forming a perfect dome, has its anterior portion tilted out, and its upper portion at the base of the nose drawn in. Without this interference the pressure of air within the natural passages counterbalances that upon the external surface, and normal development takes place. This, of course, will occur only when the obstruction takes place in early life, before the bones are firmly united."

In "The American Text-Book of Diseases of the Eye, Ear, Nose, and Throat," page 852, Dr. J. H. Bryan, of Washington, D. C., in an article on adenoids, etc., has the following to say on the U-shaped arch: "The deformity results from the combined pressure of the buccal muscles exerted on both sides and a column of air constantly striking the hard palate." He quotes Koerner as follows: "In children who suffer from nasal stenosis before shedding the deciduous teeth there occurs the cupola-shaped elevation of the palate, but no change in the position of the teeth; but if the nasal stenosis exists at the time of the change of teeth we have the high arch of the palate, and the teeth assume a very irregular shape."

Dr. C. S. BUTLER said that it was an interesting subject, and one to which he had given considerable thought, but that his conclusions differed from those of Dr. Messerschmidt. This subject was under discussion seven or eight years ago, and he had studied it after that time. Having charge of the Protestant Orphan Asylum of Buffalo, his opportunities were varied and copious. The inmates of the asylum, many of them brought there in their infancy, were in many cases mouth-breathers, and in many cases had adenoid growths. For several years he studied every case of irregularities of the dental arch, with the result that he concluded the adenoids and irregularities where they existed together were simply coincident, and one not to any great extent dependent on the other.

Irregularities are never found in the deciduous teeth, nor in the lower set of permanent teeth. If irregularities were due to mouth-breathing, it seems that of necessity they would occur in both arches. More than this, teeth are developed with crowns formed, and beside the sphenoid bone develops the maxillary bone, and the maxillary bone develops from the center outward. It seems, then, that if contracted arches were due to a pressure of the muscles of the cheeks, the maxillary bones would hold the arch apart. When the mouth is at rest the muscles have very little pressure on the arch. Taking all these things together, he could not but feel that there must be some other explanation for the contracted arch and irregular teeth. Possibly it is that the child not only breathes improperly, but breathes insufficiently, and the whole physical system is under-developed because of insufficient oxygen.

Dr. MILLINER, closing the discussion, said he was glad to know that the dental profession had for several years been studying the connection between adenoid growths and irregularities of the teeth. He had taken note of many cases of adenoid growths accompanied by irregularities, and was convinced that the adenoids were the cause of the contracted arches, but could not determine in what way the effect was brought about. He thought that probably its prime cause was the lack of sufficient oxygen, on account of defective breathing.

The subject was passed, and the convention adjourned till morning.

THIRD DAY—*Morning Session.*

The convention was called to order at 10.30 A.M., and Dr. A. P. BURKHART, of Buffalo, read the following paper:

FITTING AND ANCHORING PORCELAIN CROWNS.

Mr. President and Gentlemen: Fitting and anchoring porcelain crowns is not a new or modern operation; indeed, for many years porcelain crowns have been used. Porcelain crowns were attached to roots long before the Richmond, Logan, Bonwill, and other crowns were thought of, and in many instances they did excellent service. Instead of a metallic pin being used, a well-seasoned hickory pin was employed. The artistic results and general durability of the case in hand depended largely on the care and skill displayed by the dentist. Remembering the few instruments and appliances in use twenty-seven years ago, when I entered practice, as compared with the many instruments and appliances of the present day, I sometimes marvel at the results achieved by the dentists of twenty-five and thirty years ago. If splendid results were obtained with the old-fashioned pivot tooth, surely to-day, with the modern porcelain tooth, such as the Logan, Bonwill, and other excellent makes, far more satisfactory results, so far as durability and artistic display are concerned, can be obtained.

Cleanliness, skill, and patience are essential on the part of the dentist to enable him to give to his patients the best possible results, and this is especially true in fitting and anchoring porcelain crowns.

Of the different porcelain crowns prepared by manufacturers, my preference is for the Logan, but that is not saying that it is the only crown of merit. I consider a Logan crown, properly fitted and set, more artistic and durable than a Richmond crown, and, in case of fracture, much more easily and quickly repaired.

I will briefly state my method of fitting and anchoring a porcelain tooth,—a plan I have followed for a number of years with pleasing results to myself and patients. My method is as follows: To be very exact, especially where the teeth interlock closely, I procure an accurate wax bite; after removing it, I carefully trim, and then permit the patient to again bite into the wax, remove it from the mouth carefully, and run a plaster model for future use. Of course a bite is not necessary in all instances; I am governed by the case under consideration. Next I thoroughly clean the tooth or teeth adjoining the root or roots to be crowned, to aid me in procuring the correct shade for the artificial substitute. Having procured the proper tooth as to shade, size, etc., I next adjust the rubber dam, having, of course, previously treated and filled the root-canal. If the root to be crowned is an incisor the rubber dam is adjusted on the six anterior teeth, beginning with the canine on either side. The rubber dam must not be too thin,—the medium is best,—and in punching the holes leave a trifle more space between the holes punched than is ordinarily allowed for the filling of cavities.

Before ligating, force the rubber dam well in and around the necks of the teeth, then ligate, carrying the rubber and floss well up and under the gums; and the best results are obtained by beginning with the left canine. By this manner of ligating, the gum surrounding the tooth or root to be crowned is forced back, and higher than can be done if the tooth to be operated on is first ligated.

If the rubber dam has been well secured, next, with carborundum

wheels, cut away the undesirable tooth-structure and level the root close up to the floss ligature on the lingual palatal side of the root, and let the final preparation of the face of the root be accomplished with sharp chisels. If reasonable care is taken the rubber dam will not be injured, and the root will be kept perfectly dry. Next drill a hole in the root for the reception of the pin, but the hole should be made only a trifle larger than the pin; enlarge the hole if necessary as the operation progresses. Shape the base of the porcelain tooth, which is to rest on the face of the root; keep fitting and trying until you secure as close a joint as is possible. That reminds me to say, always procure an artificial tooth in which the base is as large or a trifle larger than the face of the root to be crowned. One of the faults of nearly all manufactured crowns is the small-sized base as compared with the width of the tooth at its tip. Having secured a close joint, next shape up by grinding the face, sides, tip, and, if needed, the posterior portion of the tooth; in other words, endeavor as near as possible to imitate its natural mate. I seldom set a crown as I obtain it at the depot. In nearly every instance I remodel by grinding it, and then with sandpaper and cuttlefish disks I thoroughly polish the parts which have been ground. A tooth thus treated when first set may be off color, but this is due to the natural teeth having become dry because of the rubber dam surrounding them. In a few hours, if in the first instance care has been taken in selecting the proper shade, the teeth will all shade up nicely.

Now we come to the final setting. With a wheel bur cut several undercuts in the hole of the root; next fill the undercuts with The S. S. White Dental Mfg. Co.'s premium gutta-percha; also place some of the same material in the hole in the root and cover the face of the root, allowing a sufficient amount for a close joint with trifling excess when crown is forced in position. Next place the crown in a crown-setter and warm gradually over a spirit flame (but do not overheat), and then quickly carry the crown to place, forcing and holding it in position with a piece of spunk held between the fingers. It is well in most cases to slightly barb the pin. Having thoroughly cooled the crown and gutta-percha, remove the excess of the latter material by trimming with a hot instrument, or sometimes chloroform is used to good advantage for this purpose. I use gutta-percha because it is durable and holds a crown firmly in place, and should necessity arise for its removal, or should it be fractured, the crown or the remaining pin can with a pair of forceps properly heated be removed and no injury be done the root. Gutta-percha will produce a closer and more lasting joint than can be secured with cement, and, all things considered, is preferable in all cases where an all-porcelain crown is used; but cement can be used by those preferring it.

By following in detail the methods I have outlined, a Logan, Bonwill, Davis, or any other make of all-porcelain tooth can be used and pleasing results obtained. Crowns of the character just mentioned are more quickly adjusted, and, in my opinion, are preferable to a Richmond crown, because they are durable and less likely

to fracture. Of course I want it understood that a first-class root is essential to success.

The rubber dam can be employed in the preparation and setting of a Richmond or shell crown, provided the tooth or root to be crowned is ligated the day preceding the beginning of the final operation. A double floss silk ligature surrounding the neck of the tooth will press the gum back, and thus enable one to press the rubber dam and necessary ligature well up under the gum to permit filling the gold band or shell crown. Before adjusting the rubber dam anesthetize the gum surrounding the tooth or root to be crowned, because the floss silk which has surrounded the tooth has created tenderness. Having adjusted the rubber dam, prepare the root and complete the operation in the usual way. By this method accuracy, cleanliness, and perfect cementation are obtained.

Discussion.

Dr. L. MEISBURGER, Buffalo, thought porcelain crowns had a decided advantage where an inexpensive crown was needed, or where pathological conditions were such as to render permanency of the operation possible, but the banded root was so much stronger than it was without the band that he always favored banding. In using the Logan crown with a band or cap over the root there is an advantage, because in case of a break a new crown can be adjusted without interfering with the band or crown that is already in position. He did not think it necessary to use rubber dam in preparing a root for a crown. Napkins will keep the root dry, and will save trouble to the dentist and annoyance to the patient. He considered the Logan crown more desirable than a porcelain baked crown, as the latter is liable to present a bulging appearance.

Dr. THOS. G. GIBSON, Buffalo, did not think it necessary to band a root to receive a Logan crown if the root is in good condition. It is very rare for a Logan crown to split a root if it is properly fitted.

Dr. W. A. BARROWS, Buffalo, preferred the Logan crown on account of its natural appearance in the mouth, and spoke of the advantage of the use of disks of articulating paper in getting the crown on top of the root in close contact.

Dr. F. W. PROSEUS, Rochester, prefers gutta-percha to cement in setting Logan crowns. He uses a high-heat gutta-percha, heating the crown in the flame of an alcohol lamp, and, handling it with a napkin, thrusts it into the root already filled with gutta-percha and immediately applies cold water on a sponge or cloth to cool it. He did not see any necessity for using articulating paper with this process. If you get contact at three points between the base of the crown and the base of the root, it is all that is necessary when set with gutta-percha. The base of the crown must be larger, or at least as large, as the base of the root; then when you remove the excess of gutta-percha which is crowded out as you force the crown home, you will have a self-cleansing surface at the joint, and the gutta-percha will form a perfect protection to the root. He favored banding roots for crowns, but did not consider it necessary to guard against the two-hundred-pound pressure of which Dr. Black spoke

yesterday. If a patient brings such force to bear on a crown he should pay for a new one.

Dr. G. V. BLACK, Chicago, said he was sometimes surprised at the continued use of the Logan crown. When they were first made he put in a great many of them, and they were nearly all broken in use. Consequently he abandoned them. He did not test their strength at that time, but from clinical observation he was convinced of their inability to stand use in the mouth. Since then he has made a good many trials of the strength of crowns in every direction,—Logan crowns, the ordinary facings, and various other crowns which are used by the profession. The results of his tests are that when the stress is applied perpendicularly they will bear a considerable strain, say seventy or eighty pounds; but will break under this or less strain if applied in any other direction, even when preserved from contact with any hard material by the interposition of a piece of soft wood. So if we use these crowns we must be very particular about the position in which they are placed with reference to the opposing teeth and the direction of stress. He would not think of putting a Logan crown on a root the condition of which was such that the patient would give the tooth its natural use,—and he sees to it that his patients do so use their teeth. Many patients avoid the use of their teeth, especially such as are crowned. The whole masticatory apparatus is lame. For years he had put porcelain crowns where they would have to stand the strain of the full muscular strength in masticating food. He was now engaged in making a full investigation in the matter of strength of teeth and crowns to withstand stress, trying the strain in all possible directions. He had abandoned the use of the Logan crowns because his patients broke them, and patients who have full use of their teeth will break them in any one's practice.

It is very necessary to be careful of the gingival margins when preparing a root for a crown. A ligature tied around the root of the tooth will lame the peridental membrane for months, and is liable to lame it for all time. The gingival margin does not run straight around the tooth, and if it is forced down to make room for a ligature the peridental membrane will be so lamed that the tooth will not be used as it should be, but will be spared on account of the pain its proper use would occasion.

Dr. A. H. PECK, Chicago, said that in his early years of professional life he had given considerable attention to mechanical dentistry, but more recently his attention had been turned in an entirely different channel, though he tried to keep track of all departments of his profession. He, however, did not feel like discussing subjects foreign to his own particular work. Being so closely associated with Dr. Black, and knowing so well what he was doing, had Dr. Black not been present he might have spoken on the subject, but Dr. Black had already said all he could have said. In his individual practice he had used Logan crowns very little, only in the anterior teeth, always banding the root and soldering the band to the metal post of the crown. He felt that in doing this he had given his patients good service. He had seen a number of crowns,

not only Logan's, but beautiful porcelain crowns, and bridges as well, chewed all to pieces. He would not, however, condemn all such crowns, for with judgment beautiful and lasting work could be done. Unfortunately, all do not use this judgment. Some do work in porcelain crowns which for artistic beauty cannot be excelled, and they will make the statement that since porcelain work came into existence they had not adjusted a crown of any other material. He did not understand how this course could be followed safely, for often the bite is so close that sufficient bulk of porcelain for strength cannot be used.

Dr. Low, Buffalo, asked Dr. Black if he approved of saddle bridges, such as were shown at the convention the day previous.

Dr. BLACK did not favor saddle bridges. His experience with them was mostly in taking them off.

Dr. Low said it was beautiful work, and he had felt anxious to have an expression of opinion on it from some one from the West, as they were used there more than in the East.

Dr. BLACK did not want to condemn all such work, as he said his experience had only been in removing some that had proved failures. Many cases no doubt were doing good service; how many he did not know. He thought that the idea of saddle bridges and open bridges was being carried to an extreme at present. In time we would know more about them.

Dr. C. S. BUTLER, Buffalo, was sorry that that question had been asked, as Dr. Goslee, who presented the saddle bridge, was not now here to answer it. Saddle bridges as he makes them are so fully imbedded in the soft tissue that nothing can get under them. We should be very careful in condemning the work of our neighbors. A case came to his knowledge quite recently of a lady who several years ago had had a Logan crown set upon a second bicuspid. She afterward went to another dentist, a man of eminence in the profession, who condemned utterly the Logan crown and the man who would place such a crown in such a position. He then placed a banded crown on the same tooth in the opposite side of the mouth. Now, these have been in place four or five years, and the banded crown is a total failure, while the Logan crown is still in good condition. He was glad Dr. Black spoke as he did of the required strength in crowns. He used rubber teeth in all his crown-work, by which he secured greater strength. They are more difficult to prepare and adjust, but you get better results in color and strength. The prime essential is bulk of porcelain.

Dr. BLACK said that when he spoke of saddle bridges he did not have in mind the little saddles described by Dr. Goslee.

Dr. Low said that even in the little saddles the soupy portions of food would crowd under and form deposits of filth and diseased mucous membrane. He had had a very early experience with saddles. His preceptor made a small saddle plate some years ago, and Dr. Low had to extract a tooth to get it out; and the filthiest breath he ever knew from any man's mouth came from the deposit under that saddle.

Dr. BUTLER said that he was not advocating saddle bridges; in

fact, he had never seen a permanently cemented saddle bridge that lasted for any great length of time and gave good service.

Dr. BURKHART, in closing the discussion, said he was an advocate of the Logan crown, and believed in it because his experience justified that belief, though he did not like to differ with Dr. Black. He attributed his success to the use of the rubber dam and the use of gutta-percha for anchorage. With this he gets a close joint, a close adaptation, and the gutta-percha does not disintegrate in the mouth. By using the rubber dam as described the tissue was not injured any more than in adjusting the dam for a filling operation. The Logan crown set as it is by many practitioners will fail, because not sufficient time nor pains has been taken to set it properly. It should take usually not less than two hours; often it will take four hours to do it properly and assure proper fitting. He did not claim that no crown he had ever set had split or broken, but the use of gutta-percha enabled him to remove and reset a crown without injury to the tooth. His experience with Logan crowns had given him the results claimed, and he felt free to advise and advocate what he had found good. In a strong root there is no necessity for a band. In a weak root use a small band and gutta-percha. He did not believe in the use of porcelain crowns indiscriminately in bicuspid and molars, though in many cases they are safe. In cases that did not allow a sufficient bulk of porcelain, a good solid gold crown is much better. In setting crowns there are three things to be advocated,—first, the use of the rubber dam. He asked all to give this a trial, as with it you can get perfect adaptation and perfect cementation. Give gutta-percha a trial. If perchance you get a tooth where even a small gold band is objectionable, by the use of gutta-percha you will get so perfect a joint that the operation will be successful. You rarely get a Logan or any other crown entirely satisfactory in shape. Dress and shape it to suit, and carefully polish it. The shade at first will seem changed, but this will be due to the dryness of the natural teeth; when they become moist the shade of the crown, if properly selected in the beginning, will be found all right after it is ground and polished.

The subject was passed, and convention adjourned.

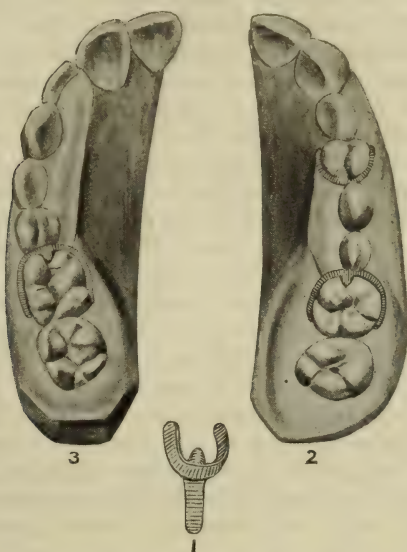
REPORT OF CLINICS.

Unilateral Vulcanite Dentures with Original Clasps.

F. MESSERSCHMIDT, Rochester, exhibited several models showing his method of making vulcanite appliances for cases where several teeth are missing on one side of the arch only, and when patients object to having sound teeth crowned for the purpose of bridging the space. A description of one case follows: The upper left second bicuspid and first molar were missing. A true model of that side of the mouth was obtained, and clasps (as described by the doctor in the May number of the DENTAL COSMOS for 1895, page 465), shown at 1 in the illustration here given, were fitted to the first bicuspid and second molar. They were then removed and perfectly articulated, after which the clasps were replaced and firmly held in position with hard wax. Teeth were ground in to

fit the space between the clasps and waxed in place, after which pink rubber was placed on the buccal side of the teeth with warm instruments. The case was then flaked, packed, vulcanized, and finished in the usual manner. In the illustration, 2 shows the appliance as it appears in the mouth; while 3 shows a case extending from the upper right canine to the first molar with an ordinary clasp around the canine.

Dr. C. F. BUNBURY, Rochester, showed retaining appliances made of aluminum. He claims that this material is far stronger than gold, is less expensive, and less conspicuous in the mouth. It may be used either in the anterior or posterior part of the mouth as an appliance for retaining regulated teeth or for holding implanted teeth in place. The aluminum must be swaged from a die



Unilateral vulcanite dentures with original clasps.

and counter-die, and it will be found just as easy to manipulate as any other metal. He showed one appliance made to hold in place a replanted right central, the six anterior teeth being more or less loose from pyorrhea. Another held two replanted centrals. A third appliance retained a right canine, lateral, and central, which had been moved to regulate. He had used aluminum bands in many other cases and found them very satisfactory.

Dr. L. C. JONES, Wolcott, described what he calls "emergency" crowns. Dr. Jones said it frequently seems imperative to prepare and place in position a crown at a single sitting, and in such a case it is annoying for a dentist to find that he has not in stock a crown that will answer the purpose. In such a case he selects from his tray of rubber teeth one that will answer to use as a porcelain facing, and cuts from German silver wire a piece long enough for a post, one end of which he files to a point, the other he flattens and notches to go between the pins of the facing. With a pair of pliers

he presses the pins of the tooth to the notches of the wire-post to hold the two together. When the root of the tooth has been prepared he places the pin and facing in position, holding it with his left hand, while with his right he presses some softened wax around the post, the pins, and over the end of the root. This gives him a correct impression of the end of the root with the crown and post in their respective positions; that is to say, the positions they will occupy when finally mounted. He now removes the piece altogether, trims off the surplus wax, and invests it in plaster of Paris. As soon as the plaster is set he pours boiling water on it, letting the water fall twelve or fifteen inches, which soon washes the wax out. He makes very sure that it is strictly clean. He now places the investment over the fire for a few minutes to dry the surface, and then puts two or three drops of soldering fluid on the metal parts and drops on this a small piece of fusible metal. With a blast from the blow-pipe the fusible metal flows; waiting a few seconds till just before it crystallizes, with the moistened end of the thumb he presses hard upon the metal and forces it into all the spaces. All that remains now to be done is to cut away the plaster, file and polish the metal into shape, and the crown is ready to mount. It fits the emergency, and hence the name, Emergency crown.

Dr. Jones's method of keeping the root-canal as well as the end of the root and surrounding gums dry after he has prepared them for a crown is as follows: After wiping out and drying with hot air, warm a piece of Gilbert's temporary stopping and press it over the end of the root and the surrounding gum, thus perfectly sealing it up. He knows that when this is done the tooth will be as dry when he returns to it as when it was closed up. He can take his time to mix his cement, and need not worry for fear of moisture. Dentists are sometimes given to use profane language, generally in their minds, when saliva or blood has crept into the tooth while they are preparing the cement, but this little stopper will keep them sweet of temper, gentle of hand, and more considerate of their patients.

There were a number of other operators at the clinics, but we failed to get report of the same in full.

PENNSYLVANIA STATE DENTAL SOCIETY.

(Continued from page 164.)

SECOND DAY—FRIDAY, JULY 6, 1900.

THE morning session was devoted to clinics.

The afternoon session convened at 2.50, with President Huey in the chair.

After the transaction of routine business, the president called upon Dr. I. N. BROOMELL to read his paper, entitled "Water-Bag Method of Making Porcelain Inlays."*

*Dr. Broomell's paper is printed in full at page 350 of this issue.

Discussion.

Dr. HEAD. I have been very much interested in Dr. Broomell's very admirable paper and clear demonstration. I was very much disappointed this morning in not being able to see his clinic wherein he demonstrated the value of this process, especially as he told me that this method was applicable to fitting the metal matrix to the cavity in the mouth. If that were so, I wondered whether he placed the head of the patient underneath the chair when he was using the chair as a plunger for the water-bag. Let that be as it may, whenever we have a new process given us we should always look for the good points first, and then, in looking for good points, be sure that we don't have to give up more good points than we obtain in changing from the older method.

The only possible advantage in this method over the method long since used by those who have made inlays lies in the possibility of making closer adaptation. It was my hope this morning that Dr. Broomell would make an experiment on a cavity, and that I should likewise be permitted to make the same experiment on that cavity, in order that we might see if the adaptation of the plunger was more perfect than that obtained by spinning platinum into position. Unless the adaptation is better I should consider this method somewhat wasteful in time, for when the patient is in the chair and the cavity is already prepared, I think the gentlemen who saw me work this morning can bear witness that it took from one to two, perhaps three, minutes to form that matrix, and this method, even if it took only long enough for the plaster to set, would take much longer than that. Then, in the one method you have the tooth, and work directly from its margins; here we have a plaster mold made, and plaster, unfortunately, expands. And while you may, of course, get very perfect adaptation to the plaster, it is always questionable whether the adaptation through a plaster mold will be as perfect as an absolute impression obtained from the cavity itself by means of careful spinning and burnishing. It is true that swaging by this method does drive the metal into all the recesses, but when the cavity in the mouth is covered by a piece of platinum foil,—that, I am glad to say, through Whites' careful treatment is now almost, if not quite, as soft as tin foil,—when that cavity is covered with platinum foil it will be immovable; the outlines of the cavity are carefully marked, then follows burnishing or spinning from the edge of the cavity around and across to the bottom in such a way that that metal, from having been soft, becomes as dense and rigid almost as a sheet of iron. I think that merely from the theoretical ground it might be seen that there could hardly be any possibility of obtaining better adaptation even with swaging, for the method of spinning the platinum into place is very much akin to our method of spinning gold filling into a cavity. I should say that since platinum in the one instance is stretched fairly and carefully against the cavity walls, while the platinum in the other instance is swaged against a plaster impression of that cavity, which plaster is likely in all probability to have expanded, I should think that the method of spinning was much superior; and when we come to consider that

the method by spinning can be accomplished inside of from one to three minutes, and that this—How long does it take?

Dr. BROOMELL. About an hour. It takes probably fifteen minutes to make a matrix.

Dr. HEAD. Then the plaster will set sufficiently hard in fifteen minutes?

Dr. BROOMELL. Yes.

Dr. HEAD. But I will add another advantage. In using the cavity we have the dentin or enamel of a texture of very great hardness, while by the method described the matrix is made in a cavity whose walls and margins are composed of plaster having set in from ten to fifteen minutes.

Then this method, as I understand it, is applicable to occlusal cavities, labial cavities, and perhaps approximal cavities, where the other tooth is impinging. It seems to me that, however it may be regarded, though it be superior, its use is limited, because the spinning process is applicable to all cavities where the porcelain inlay can be used; this is applicable, as I see it, to those cavities only where a good impression can be made. Mr. President, I fear I cannot see any special advantage in this new process, but I am very glad to have heard the admirable paper and feel much pleased with the excellent diagrams.

Dr. ROBERTS. In Dr. Head's computation of time, I would like to ask him how long it takes him to make a porcelain inlay?

Dr. HEAD. I will not answer that question myself, but I will ask one of the gentlemen who were present this morning and saw me make them, to please answer the question.

Dr. KASSAB stated that the time was ten minutes.

Dr. ROBERTS. The advantage, apparently, is with Dr. Head, if he can make an inlay in ten minutes. The advantage of an apparatus of that kind would be that it would enable the dentist to give that work to another person, with the assurance that when the inlay was returned it would fit the cavity.

With regard to the expansion of the plaster in cases of that kind, I think it would be an advantage rather than a disadvantage. If the plaster expands the inlay would be a little larger, which would about compensate for the thickness of the platinum used probably, and necessarily make a tighter-fitting plug.

Dr. HEAD. What if it were too large?

Dr. ROBERTS. Then I would say you had bad plaster that would expand that much. It seems to me it would be an excellent apparatus to use in conjunction with the method of spinning the platinum in, because it allows the dentist to do the particular part of the work and let some one else do the work which can be done by any one, while the dentist may be doing something else in which his time is worth more than the other's. I would recommend both.

Dr. HEAD. There was one point spoken of by Dr. Roberts which interested me very much, and which I had intended to mention. There are many dentists who take impressions of cavities and give them over to their assistants to fit for them, and there are some who get excellent results from this process, and therefore it should

be given a fair trial. But I only wish to warn those who are beginning or are thinking of starting to make porcelain fillings that they should not do it with the idea of saving time or doing it easily, for under the most favorable conditions they will probably be doomed to disappointment. Never having done it myself, I am inexperienced; but the man who makes a matrix and gives it to an assistant to fill and return to him reminds me very much of a countryman who had lost his father. He went to an artist and told him of his loss, and that he wanted him to draw a picture of his father. The artist replied, "Very well, bring me his photograph and I will do it." He said, "Unfortunately, I have none. What shall I do? I will go to his tailor and get his measurements, and I will give you his complexion and color of his hair; and I will tell you just how he was, and I will get you to make a portrait that way." The artist said, "I will try." So the son brought the measurements, and the artist made the picture. When it was finished he sent for the man who had ordered it and asked him how he liked it. He answered, "I like it, but, my! how he has changed!"

Dr. ROBERTS. I agree with Dr. Head that it is almost impossible to get a good inlay from a matrix which is spun in the mouth by giving it to some one else to do. It is only once in a while you will be able to do so, but as a rule it will be a failure and you will be disappointed and disgusted with porcelain work. With this appliance we will overcome that difficulty, and I would say it was a good thing to save time.

Dr. BROOMELL. Dr. Head's argument appeared to be made from the standpoint that this is designed to entirely supersede the older method. That is not the idea at all; it is simply to be used in conjunction with the old method, and to be used as an assistant to that method. It is always my custom even when using this to spin a piece of the foil into the cavity, this part of the work being done as a finishing process. Dr. Head in his first speech seemed to dwell upon the subject of time; how much time it took and how much time was saved. In his second speech he contradicts himself by saying time should not be considered; and so I look at it. If we get the result, the time is of secondary importance. One other advantage that I claim for this process or method is that you can prepare half a dozen cavities, take the impressions of them,—in fifteen minutes, if you please,—lay them aside, and discharge your patients; and when the patient returns you have them all ready to insert, and in the meantime the patient is having relief.

In regard to approximal cavities, Dr. Head seems to think this cannot be used in cavities so situated. Any cavity in which you can place an inlay,—in an approximal cavity you can secure an impression in wax, because the wax may be forced in and withdrawn as readily as a finished inlay may be,—it is just as applicable to an approximal cavity where there is an impinging tooth as it is in a labial or occlusal cavity. Dr. Head also speaks of the weakness of plaster of Paris. It is strengthened by the rubber back.

In answer to a question by Dr. ALLEN,

Dr. BROOMELL said: I think where thorough dehydration is given, where you take out all the water possible, you will have very little shrinkage; you can almost finish it in one baking, and, unless it is very large, it would not be necessary to burnish this a second time.

Dr. REGISTER asked a question, which the speaker answered as follows:

Dr. BROOMELL. With regard to the comparative worth of the two methods, I would say in twenty-five per cent. of cases at the present time I use this method, and in seventy-five per cent. I use the old method. I get results with this which I could not get with the ordinary burnishing method, and I get results by that method which I could not get with this. As I said in the beginning, it is an adjunct and addition to the present method, and is not intended to supersede the present method of working.

I might state one or two instances in which I think this work is particularly applicable. We have a patient with a large approximal cavity in a bicuspid, we will say, and we are undecided whether to fill it with a gold, amalgam, or phosphate filling. We decide that the tooth will only support a phosphate filling, and we put in what we call a temporary filling. Now, in that class of cases I think they are applicable. Even if they fail in time, they will last five or ten times as long as an ordinary cement filling; and in that way I use a number of inlays simply as a protecting medium or cover for an ordinary phosphate filling.

On motion, the subject was then passed.

The next paper was that of Dr. W. J. ROE, of Philadelphia, Pa., entitled "Hypertrophy of the Gums,"* with exhibition of a case previous to operation.

Discussion.

Dr. SCHAMBERG. I think Dr. Roe deserves a great deal of credit for the investigation of a disease which is rather rare, and which would naturally not receive the attention of many practitioners unless they be especially fitted for this particular form of investigation. Too little investigation of it has as yet been carried on, and not as thoroughly, apparently, as he has made in this case. We can combat disease more readily when we are aware of its cause, and we can help to prevent a disease by doing away with certain habits and forms of life likely to predispose to the condition. I should judge that the fungus spoken of is found more readily in a saccharine medium, and I have in mind the disease diabetes as a possible predisposing condition which this disease may naturally follow. I do not know how frequently this fungus is found normally in the mouth. We know that in diabetes we have certain inflammatory changes, and it is barely possible that the saccharine fluids may cause this condition. I believe that the gums show that they are as a rule highly reddened in this hypertrophied condition, and therefore I suppose the process is probably one of an inflammatory origin, due to the irritation of some substance in the body, whatever it may be, and that the *saccharomyces* may simply be

*Printed in full at page 341 of this issue.

present incidentally to the condition. I do not wish to propose that as a theory, but simply to suggest it as a possible cause of the condition.

Dr. BECK. What was the constitutional treatment in this case?

Dr. ROE. One author says no constitutional treatment has availed in any way to lessen or retard the development of this condition. In one case Erichsen removed the gums, the alveolar process, and the teeth, and did a complete operation at the time, as he imagined, and yet there was a recurrence; and that recurrence was followed soon afterward by mollusum fibrosum developed in the ears, fingers, and almost every portion of the surface of the body in the subcutaneous tissue. In following up or looking into the history of the case he reports that one other child was born after he had prepared the paper, and this child was examined very carefully, and there was no evidence of anything present. He used potassium iodid in the first case reported for a long period of time without any appreciable benefit. They have been treated by physicians for months and years. The patient you have seen has been under the care of a physician for years, and has received a variety of treatments without any appreciable benefit.

Dr. H. M. BECK cited a case of hypertrophied gums in a pregnant woman. All that showed of the central and lateral incisors and canines were the cusps; the hypertrophy extended not only to the canines and central and lateral incisors, but also to the bicuspid and molars. A test was made, and acid action found in the mouth. I thought the condition was due to the acid action in the mouth. Nothing could be done at the time, but after the birth of the child, about probably a month afterward, the gums were thoroughly painted with tincture of iodine and lactic acid was used, and in about two months after this treatment the gums returned to their normal condition without any operation being performed; and they are perfectly normal to-day.

Dr. BECK. The reason I asked the question was that I had had three children who were exceedingly fond of candy, and who had the privilege of eating it as much as they chose. Their gums were treated by a physician, and the physician failed, by merely making a local application. I suggested constitutional treatment, and I thought if the patients were put on a strict diet and a local application made of equal portions of aconite and iodine the patients would recover. So in the three cases the children were put upon a strict diet, a tincture of iodine and aconite was applied, and within eight months the patients had recovered; and they have never had a recurrence of the disease. That is why I asked the doctor as to constitutional treatment.

Dr. CRYER. I am sorry I was not here when the paper was read. These cases are very interesting to me. In 1891 a patient was brought from Cleveland to the Hospital of Oral Surgery. He was a little older than this boy. He had a condition of hypertrophied gums extending from the second molar on the right around to the left on both the upper and lower jaws. Last year in this room, and also at Niagara Falls, I showed pictures of the boy previous to

operating, and one afterward, and then another taken five years after the operation. There was shown in that case the marked success that the operation advised by Dr. Garretson produced on this child. This is a similar case, with the exception that it is not so marked on the anterior teeth as in that case. Dr. Garretson was criticized somewhat for the mode of operation, but by watching the case and carefully keeping track of it, and from the condition at the present time, it was evident that it was justifiable. I am sorry I did not hear Dr. Roe tell how he intended to operate on this case, as it is very interesting from my standpoint,—that of surgical treatment of diseases of the mouth and jaws. I am very glad to have seen the patient, and I censure myself very much for having been away when the essay was read.

Dr. ROE. I wish to thank you as members of this society for your great kindness and courtesy to me. It has been a pleasure to me to bring the patient before you and to study the case with you. When I operate on the boy I am going to remove the tissue carefully and preserve it, and take sections from different portions, and include the periosteum or entire gum-tissue at the different portions; and I want at the time of the operation to examine the bone very carefully. If I find any place where it is hypertrophied and thickened beyond what I think is normal, I shall remove it for the purpose of examination, if I do not consider it necessary for anything else, so I can study the case. It is a question as to whether the bone is involved or the involvement is of the gum-tissue and periosteum of the gum-tissue itself. Dr. Schamberg hit very closely upon the idea I had in the point which he tried to make clear to you,—that this was not a true hypertrophy. It is against the pathology of true hypertrophy, but histological examination proves that there is some degree of inflammatory action present, and the question arises, What produces it? That question we cannot decide to-day. If we had a number of cases where we could examine the tissue from different patients and find the *saccharomyces* acting in each case, we would be more justified in assuming that this was the cause alone. We cannot state definitely that this is the cause, but it is most probably the cause of the inflammation because of its character, having extended through a course of disease of now six years' duration. There is no other cause of inflammation which would probably exist for that length of time without other manifestation. This form of inflammation, which, as Ziegler, among other pathologists, has shown, may be and is due to the *saccharomycetes* when incidentally or intentionally introduced into the tissues and there developed. Dr. Schamberg said that the finding of the *saccharomycetes* might be a coincidence. I think it is most probable that *saccharomycetes* introduced into the gum-tissue cause a slow development, due to the chronic or mild form of inflammation which these organisms produce. The case referred to in which the disease was associated with pregnancy, in 1897, is similar to a case I have included in the table, and reported by Gross, where hypertrophy appeared—hypertrophy of the gums—through three successive pregnancies, and then disappeared after pregnancy. We have

no histological examination to see whether that was inflammation arising from some local irritation or a true hypertrophy, as this has been assumed to be. If that were a true hypertrophy it would persist; that is one of the fundamental features of hypertrophy, it persists. The fact that it subsided after each confinement appears to me to clearly show that it was not properly included with hypertrophy.

Dr. ROBERTS. I do not feel like discussing Dr. Roe's paper, because I cannot. I also feel that there are comparatively few of us who can creditably discuss a paper of that character, but it gives information which we are all exceedingly glad to receive, and I would move a vote of thanks be tendered Dr. Roe for his paper.

Motion carried.

On motion, the subject was passed.

(To be continued.)

DENTAL SOCIETY ANNOUNCEMENTS.

THE DENTAL SOCIETY OF THE STATE OF NEW YORK.

THE thirty-third annual meeting of the New York State Dental Society will be held on Wednesday and Thursday, May 8 and 9, 1901, in the assembly hall at Hotel Ten Eyck, Albany, N. Y. The Business Committee have arranged the following program:

President's Annual Address: John I. Hart, D.D.S., New York.

Report of Correspondent: H. D. Hatch, D.D.S., New York.

Report of the Committee on Practice: A. R. Cook, D.D.S., Syracuse, N. Y.

Essays: "Surgical operations for Closure of Cleft Palate in Relation to Speech and Health," G. V. I. Brown, M.D., D.D.S., Wisconsin. "Removable Bridge-Work," W. E. Griswold, D.D.S., Denver, Col. "Pericemental Abscess," E. S. Talbot, M.D., D.D.S., Chicago, Ill. "Laws Regulating the Practice of Dentistry, and Their Enforcement," W. A. Purrington, LL.D., New York.

All reputable dentists are cordially invited to attend. Special rates at Hotel Ten Eyck, \$3.50 per day.

JOHN I. HART, *President*, New York.

W. A. WHITE, *Secretary*, Phelps.

FIFTH DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

THE thirty-third annual meeting of the Fifth District Dental Society is called for April 9 at 5 P.M., at the office of Dr. C. H. Barnes, Syracuse, N. Y. It is proposed to immediately adjourn to April 12, at 2 P.M., at the Yates Hotel, so that our regular meeting may immediately precede the dinner given in honor of Dr. S. B. Palmer, which occurs the evening of April 13. Mark off both days (April 12 and 13) and plan to attend all sessions. A full program will be issued later.

R. B. REDWAY, *Sec'y*.

SIXTH DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

THE thirty-third annual meeting of the Sixth District Dental Society of the State of New York will be held at the Hotel Bennett, Binghamton, on Thursday and Friday, May 2 and 3, 1901.

FREDERIC W. MCCALL, *Sec'y.*

SEVENTH DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

THE thirty-third annual meeting of the Seventh District Dental Society of the State of New York will be held at the Powers Hotel, Rochester, N. Y., Tuesday and Wednesday, April 9 and 10, 1901.

The Business Committee have arranged an excellent program.

F. MESSERSCHMITT, *Sec'y.*

TRI-STATE DENTAL ASSOCIATION.

THE Tri-State Dental Association of Indiana, Kentucky, and Illinois will meet in Paducah, Ky., May 28, 29, and 30, 1901.

W. H. BROSMAN, *Sec'y*, Albion, Ill.

W. H. PITCHER, *Pres.*, Paducah, Ky.

TRI-STATE DENTAL MEETING.

THE third triennial meeting of the State Associations of Ohio, Michigan, and Indiana, known as the original "Tri-State Dental Meeting," will be held at the German House, corner of Michigan and New Jersey streets, Indianapolis, Ind., June 4, 5, and 6, 1901, beginning at 10 A.M., Tuesday, June 4. All practitioners who conduct their practices in a manner to command the respect of their fellow-practitioners are invited to attend and participate in the proceedings, whether they are members of a state association or not. These meetings are the largest and most interesting held in the United States. Fully eight hundred dentists will be present. The program includes some sixty clinics of great interest and importance. Railroad rates of a fare and a third for the round trip have been granted by the Central Traffic Association throughout the whole territory. For further information, see the May journals, or address

GEO. E. HUNT,

131 E. Ohio street, Indianapolis, Ind.

NATIONAL DENTAL ASSOCIATION, SECTION IV.

SECTION IV of the National Dental Association embraces Etiology, Physiology, Hygiene, Prophylaxis, and Electricity.

Contributions upon any of these subjects are earnestly solicited.

J. D. PATTERSON, *Chairman.*

L. E. CUSTER, *Secretary.*

KENTUCKY STATE DENTAL ASSOCIATION.

THE annual meeting of the Kentucky State Dental Association will be held in Louisville, on the 14th, 15th, and 16th of May, 1901. The usual hotel and railroad rates will be procured.

F. I. GARDNER, *Sec'y*,
656 Third ave., Louisville, Ky.

SOUTHWESTERN MICHIGAN DENTAL ASSOCIATION.

THE annual meeting of the Southwestern Michigan Dental Association will be held at Battle Creek, April 9 and 10, 1901. A good program is assured.

C. W. JOHNSON, *Secretary*,
Lawton, Mich.

NEBRASKA STATE DENTAL SOCIETY.

THE twenty-sixth annual meeting of the Nebraska State Dental Society will be held in Omaha, May 21-24, 1901.

F. D. SHERWIN, *Cor. Sec'y*,
Omaha, Neb.

SOUTHERN WISCONSIN DENTAL ASSOCIATION.

THE seventh annual meeting of the Southern Wisconsin Dental Association convenes at Delevan on the 21st day of May, 1901, for a three days' session. The entire profession are cordially invited to meet with us. A good program is assured.

J. H. REED, *Sec'y*.

IOWA STATE DENTAL SOCIETY.

THE thirty-eighth annual meeting of the Iowa State Dental Society will be held at Clear Lake, May 21, 22, and 23, 1901. All reputable dentists are invited to meet with us.

I. C. BROWNIE, *Sec'y*.

ALABAMA BOARD OF DENTAL EXAMINERS.

THE Board of Dental Examiners for the State of Alabama will meet in Montgomery, Ala., on Monday, May 13, 1901, at 10 A.M. In addition to the regular written examination the following requirements will be added, viz:

Each applicant must fill at least two teeth, approximal cavities, one with gold, the other with alloy, the work to be done under the immediate supervision of the board, which will determine or pass on suitable selections of cavities. The board will try to furnish subjects, but, failing to do so, applicants for license must find or bring their own subjects, also instruments and material.

Each applicant must bring a partial denture of at least four teeth ready for soldering (hard solder required), which work must also be done under the supervision of the board.

THOS. P. WHITBY, *Secretary*.

ILLINOIS STATE BOARD OF DENTAL EXAMINERS.

THE next regular meeting of the Illinois State Board of Dental Examiners, to examine applicants for a license to practice dentistry, will be held in Chicago, May 2, 3, and 4, 1901, at the Chicago College of Dental Surgery, cor. Wood and Harrison streets. Candidates must come provided with the necessary instruments, rubber dam, and gold to perform practical operations and such other work as is deemed advisable by the board.

Those desiring to take the examination should matriculate with the secretary ten days before the date of meeting. The examination fee is ten dollars.

J. G. REID, D.D.S., *Sec'y*,
1006 Champlain Bldg., 126 State street, Chicago, Ill.

OKLAHOMA BOARD OF DENTAL EXAMINERS.

THE Oklahoma Board of Dental Examiners will meet at Oklahoma City on May 7, 1901, at 10 A.M., for the purpose of examining applicants for licenses. The undergraduate must be prepared to do practical work.

E. E. KIRKPATRICK, *Sec'y*.

EDITORIAL.

THE STATUS OF THE AMERICAN DENTAL DEGREE IN GERMANY.

THE *Muenchener Neueste Nachrichten* of February 6 publishes an account of the arrest and trial of a dentist, Emil Gumpoldt, for advertising himself as "Amerikanischer Zahnarzt" upon the authority of a certificate of the Dental Examining Board of the State of Illinois. He was the holder also of a diploma which, it is charged, was issued by a fraudulent diploma concern in Chicago.

The case enlisted the interest of the Hon. James H. Worman, United States consul at Munich, who has instituted active measures toward protecting the dignity and reputability of the American dental degree as conferred by legitimate American schools. We append certain correspondence relating to the matter which will clearly show the active steps which are being taken to rectify the harmful effects of the illicit diploma traffic, and to secure proper credit for the legitimate dental degree.

With respect to the diploma of the Haskell Post-Graduate School, an error has evidently arisen, inasmuch as the diploma of that institution is merely a certificate of the completion of the prescribed course of study, but does not carry with it a dental degree. Its misuse by the holder of a fraudulent diploma, as in the case reported by the consul at Munich, furnishes sufficient ground for extreme

care in the issuance of such certificates, and caution as to the admission of students into post-graduate schools, in order that only those who are the holders of diplomas from recognized reputable institutions shall be permitted to receive post-graduate certificates.

DEPARTMENT OF STATE, WASHINGTON, February 6, 1901.

W. C. BARRETT, ESQ., Chairman Committee on Foreign Relations of the National Association of Dental Faculties, 208 Franklin st., Buffalo, N. Y.:

Sir,—At the suggestion of the consul at Munich I inclose for your information copy of a despatch from the consul in regard to American dental degrees in Germany, and the efforts which are being made to prevent those who hold fraudulent diplomas from practicing dentistry.

I am, sir, your obedient servant,
(Signed) THOS. W. CRILLER, *Third Assist. Sec'y.*

No. 38.

CONSULATE OF THE UNITED STATES OF AMERICA,
MUNICH, GERMANY, December 29, 1900.

HON. DAVID J. HILL, etc., etc.:

Sir,—Referring most respectfully to my unnumbered despatch of April 21, 1900, upon the subject of American dental degrees in Germany, to which I was honored with a reply by your department under date of July 17, 1900, No. 36, I have the honor most respectfully to report at this time:

1. That I have since placed myself in relation with the organized associations of American dental graduates in Southern Germany, and, in connection with the learned counsel of this consulate, have advised them how to conduct themselves in their relations with the government and press, and in the defense of those of their members who have been or are being prosecuted for what is termed here an "unlawful" use of their honestly acquired titles of D.D.S.

2. That at the same time in all cases, whether of gentlemen holding legitimate diplomas or of persons holding illegal issues, I have been in constant communication with the Bavarian Department of Justice and the Foreign Office to protect the rights of all legitimate holders of such American degrees correctly issued, to use and advertise their degrees, and to secure the prosecution and conviction of those illegally holding American certificates or honors.

My task has been a peculiarly difficult and delicate one, as there is, in the first place, even among educated and intelligent Germans, a misconception of the character of American universities, and especially the schools of dentistry, on account of many of them being, as far as their original organization is concerned, in form at least, private concerns; and among the less informed a strong prejudice against American degrees on this account. It has, therefore, been a matter of propaganda to bring the authorities to understand that under the republican forms of government existing in the several states, where so much is necessarily left to private initiative, these institutions, although in form private enterprises, by virtue of their charters and the right of visitation and control by the state authorities, are, in fact, public institutions.

Another difficulty lies in the fact that the German universities, stimulated by the reputation and success of American dental colleges, have added dental departments to their curricula which, in theory at least, are not inferior to the average American institutions; and, among others, the University of Munich has recently established such a department, which in equipment and the character of its instruction will prove inferior to no other.

The purpose of this instruction in dentistry at the German universities is to offer to Germans the opportunity of educating themselves thoroughly in that art, and to raise the estimation of German dental degrees to the American standard, so as to induce students to remain at home.

It is easy to comprehend how this jealousy of American degrees finds its expression not only among prejudiced people, but also among holders of German dental degrees, in denunciation of American degrees and dental institutions, and also in efforts to bring about a prohibition of their use in Germany.

I have good reason to believe that I have met these difficulties successfully and have been able to convince the authorities here of the value of legitimate American university honors and the titles of technical schools, and of the expediency of not prohibiting them; also of the sincere desire of the United States Government to do everything possible to prevent the issue of worthless diplomas and to effect the closing of institutions issuing them.

My main endeavor has been to secure such evidence as might be of service in proceedings against the institutions issuing illegitimate diplomas, and I have already obtained possession of original diplomas and certificates in two instances where they were purchased in America by Germans against whom proceedings are now pending.

In one of these cases I have had the diplomas copied by photography and typewritten copies of the certificates made, specimens of which are hereto annexed, marked Exhibits A, B, C, D, E, F. I have applied to the legal authorities to have the original diplomas and certificates in these cases delivered to me for transmission to the State Department, for use as evidence in any proceedings it may be deemed expedient to institute, and, though such a course is difficult to effect, I hope for a favorable answer.

Owing to the urgency of the case, I have also transmitted copies of these diplomas and certificates to His Excellency the Governor of Illinois, and a copy of my letter to him is hereto annexed, marked Exhibit G.

On December 10, 1900, a very interesting case was settled in the courts of Munich against one Samuel Gumpoldt, once a "Zahntechniker," now a full-fledged "American dentist," claiming also to be the holder of the American degree of Doctor of Dental Surgery. He obtained the "doctorate" at one of those non-reputable dental schools of which two remain to be suppressed in Chicago. "Dr." Gumpoldt went to America some time last spring, remained a few weeks in Chicago, and came back with a certificate from the "State Board of Dental Examiners" permitting him to practice dentistry in Illinois. The States Attorney here made the polite request that I should testify as an expert in the case in order to establish the illegality of the defendant's claim, and as a result the "doctor" was condemned for terming himself "Amerikanischer Zahnarzt" and heavily

fined. The case, of course, will be appealed, but it is to be hoped that the Governor of Illinois will cause an inquiry into the illegal practice prevailing in that state by issuing such certificates as in this instance, as the State Board is only expected to admit to examination a candidate who has spent at least six months in a regular dental school. In this instance the "doctor" made certain claims as to studies in Roumania, but I fear the State Board of Illinois has no "evidence" to substantiate these claims.

Another case now in the courts is affording me the opportunity to secure by the aid of photography the needful evidence to convict of such illegal practice the other now remaining non-reputable institution in Illinois making a business of the sale of diplomas, and I shall have the honor to submit this report by an early post.

The rapidly growing tendency among the peoples of the German Empire to bar out as far as possible all foreign competition may, as I have already suggested, force the governments of the various states to a more determined warfare in behalf of the dentists educated in the schools of Germany only, against those bearing the distinctive honors of the American dental schools, thus ultimately affecting not only the good standing of American dentists abroad, but also destroying their usefulness, if not barring them out altogether. It is to be hoped, therefore, that the course taken by this consulate, however great the sacrifice in labor and time, may prove both timely and judicious, maintain the integrity of our worthy schools of dentistry, and preserve them in honor abroad as well as at home.

To this end I would most respectfully ask you whether you do not deem it expedient that publicity be given through the press in America such institutions, and in Germany to punish persons holding and advertising their diplomas, in order to deter foreigners from purchasing such titles, and thereby to destroy the market for them? I have abstained entirely from any communications whatever to the press, but believe that the widest publicity should be given the whole subject.

I have the honor, etc.,

(Signed) JAMES H. WORMAN, *United States Consul.*

Inclosures:

Photograph of diploma granted "Johannes Fuchs," conferring the degree of Doctor of Dental Surgery, by the "Cosmopolitan Post-Graduate College" of Chicago. Dated October 25, 1899. Signed, C. A. Weil, Dr. Med., chancellor; Emanuel Kargan, D.D.S., dean; C. A. Williams, rector.

Photograph of diploma granted Dr. Johannes Fuchs by the Haskell Post-Graduate School of Prosthetic Dentistry. Dated October 16, 1899. Signed, L. P. Haskell, president; G. A. Grant, secretary.

BUFFALO, N. Y., February 9, 1901.

DEPARTMENT OF STATE, THOS. W. CRILLER, Assist. Sec'y:

Sir,—I am in receipt of a communication from you inclosing one from the United States consul at Munich concerning the American dental diploma and other matters. I can assure you, sir, that I deem it of the very highest importance to the dental profession of America, and I believe that the consul is doing a work that will advance the interests of many American citizens. Unless I am advised that the communications are in

any way confidential, I shall forward them for publication in some of our most important professional journals. I beg that any future advices that the State Department may receive of the same nature may be forwarded to me for communication to the dental profession of America.

I am, very truly yours,

(Signed) W. C. BARRETT,
Chairman Foreign Relations Committee
National Association of Dental Faculties.

DEPARTMENT OF STATE, WASHINGTON, February 13, 1901.

W. C. BARRETT, ESQ., Chairman Foreign Relations Committee National Association of Dental Faculties, Buffalo, N. Y.:

Sir,—I have to acknowledge the receipt of your letter of the 9th inst., suggesting that the despatch from the consul at Munich in regard to bogus dental institutions be published. In reply, I have to say that the Department sees no objection to your publishing it.

I am, sir, your obedient servant,

DAVID J. HILL, *Acting Sec'y.*

BUFFALO, N. Y., February 9, 1901.

HON. JAMES H. WORMAN, United States Consul at Munich:

Sir,—I am in receipt of a communication from the Department of State of the United States Government inclosing a report, or copy of a despatch, concerning American dental degrees in Germany. I inclose copy of my answer to the Third Assistant Secretary in reference thereto. I beg personally to assure you that the great number of dentists in the United States and the graduates of American colleges abroad will fully appreciate the importance of the work you have undertaken, and will extend to you their enthusiastic support.

By this mail I will forward to you copies of the reports of this committee, which will give you some idea of what we are attempting to do. Let me say that we now have in prison a number of those who have been engaged in issuing fraudulent diplomas, and hope the traffic is now upon the point of being broken up in America.

I beg on the part of my colleagues to tender any service on our part in your good work, and I request that I may be favored with any reports or other documents which may assist in the work in which we are engaged.

Very truly yours,

(Signed) W. C. BARRETT,
Chairman Foreign Relations Committee
National Association of Dental Faculties.

A BIT OF DENTAL HISTORY.

IN view of the recent culmination of the effort to secure legislation creating a dental service in connection with the army, it will doubtless interest our readers to learn something of the origin of the movement.

We find reported in the *Dental News-Letter*, Vol. XII, 1858, that

at a meeting of the Western Dental Society, held in Quincy, Ill., on July 21, 1858, Dr. H. J. McKellops, of St. Louis, offered the following preamble and resolution:

"WHEREAS, Owing to the great inconvenience of the officers and soldiers in procuring competent dentists, when necessarily required, and knowing the difficulty in which they are placed, being stationed at distant posts where it is absolutely impracticable for a regular practitioner of dentistry to visit them; therefore,

"Resolved, That this society appoint a committee of five for the purpose of memorializing Congress on the necessity of appointing dentists to be attached to the regular army, and that we recommend the same to the consideration of the American Dental Convention, and ask their co-operation with us."

The resolution was adopted, and the following committee appointed: Drs. McKellops, Spaulding, Forbes, Branch, and Lewis. President Allport was added by vote.

At a meeting of the American Dental Convention, held in Cincinnati, on Thursday, August 5, 1858, Dr. McKellops introduced the following:

"Resolved, That the convention appoint a committee of five to memorialize Congress on the necessity of appointing dentists for service in the regular army, the committee to act in concert with that of the Western Dental Society."

In pursuance of the resolution a committee was appointed, consisting of Dr. James Taylor, Cincinnati, Ohio; Dr. Geo. Watt, Xenia, Ohio; Dr. Frank Fuller, Portsmouth, N. H.; Dr. W. H. Atkinson, Cleveland, Ohio, and Dr. Stone, Lexington, Ky. The records do not show what steps were taken by the joint committee to further the ends for which they were appointed.

The editor of the *American Journal of Dental Science*, in its issue of July, 1859, comments upon the matter as follows:

IMPORTANCE OF ARMY AND NAVY DENTISTS.

At the last meeting of the American Dental Convention, a committee was appointed to memorialize Congress on the necessity of appointing dentists for the service of the army and navy. The resolutions authorizing the appointment of this committee were offered by Dr. McKellops. We are glad that this subject has attracted the attention of the convention, although to our certain knowledge the importance of it has been advocated by Dr. Maynard for these fifteen years past, at Washington City, and had so far impressed Mr. Fillmore in its favor that he brought it before the cabinet in council. The Secretaries of War and the Navy took some action in the matter. Nothing resulted from the former, and the latter went to work so stupidly and vexatiously as to make it necessary to countermand his orders in the matter as soon as his term of office expired, which happily occurred within a few days, and before his new "regulation" was issued. More recently, Mr. Davis, when Secretary of

War, received the proposition as one of great value; and Mr. Dobbin, Secretary of the Navy, to whom he addressed a note upon the subject, at once and heartily approved the proposition and expressed himself as under deep obligations to Dr. M. for bringing to his notice a project which his own sufferings from his teeth, and benefit from their proper surgical treatment, convinced him was a most humane suggestion.

No official action, however, was taken. The time was not favorable. There had been pending before Congress for some time a bill affecting the corps of surgeons of the army, and it was thought best not to propose anything that might defeat that bill. One of the army surgeons who favored the new proposition visited the Surgeon-General with Dr. M., and so far was he successful in advocating the project that the Surgeon-General was willing to advocate the establishment of a corps of army dental surgeons of six to begin with, to be entirely distinct from the corps of surgeons in their duties, examinations, promotions, and rank.

Although no official action has ever yet been had in the matter, the project is daily ripening. We have reason to know that Dr. M. misses no proper occasion to advocate and illustrate its propriety to such of his patients, from the President to the common soldier, as may have authority of place, official or legislative, or may be in any way affected by it. All approve the measure; and when the most favorable time arrives for legislative action, we have no doubt that Dr. M. will carry it through successfully.

It will be seen, then, that the idea which has only recently been brought to a successful issue is by no means a new one, and that the difficulties which attended the first efforts at legislation have hampered the cause from the beginning.

In the meantime, however, the growth of public appreciation of dental service and the attitude of the public mind, which has come to regard dentistry as one of the common necessities of life, has finally created a demand for dental service in the army which has at last been practically recognized.

FIRST APPOINTMENTS OF CONTRACT DENTAL SURGEONS, UNITED STATES ARMY.

A COMMUNICATION from Dr. Jno. S. Marshall, president of the Examining Board of Dental Surgeons, United States army, informs us that fourteen candidates have so far been ordered before the board by the Surgeon-General for examination, and that the following two gentlemen have successfully passed the examinations and have received their appointments as contract dental surgeons, United States army: Siebert Davis Boak, of Martinsburg, W. Va., graduate of National University, Dental Department, Washington, D. C.; Edward Clarence Lauderdale, of Naples, N. Y., graduate of University of Buffalo, Dental Department, Buffalo, N. Y. These

gentlemen have been ordered to report for duty at San Francisco, Cal., April 15, for service in the Philippines.

Some accompanying features of the communication are worthy of serious consideration by both faculties and candidates,—viz :

“Only two, as you will see by the above report, have successfully passed the examination. The board has been disappointed in the professional qualifications of most of the young men who have presented themselves. The examination does not cover any subjects which have not been taught in our best dental schools, and the board believes that the questions submitted in the examinations have been of a practical nature and eminently fair. It is to be hoped, therefore, that our dental schools will not recommend any young men to come before this board who are not thoroughly well qualified, theoretically and practically, in all of the branches comprising the curriculum of our best dental schools.”

A DENTAL COLLEGE IN THE PHILIPPINES.

It is interesting to learn that the Dental College of Manila is now in operation. Dr. Louis Ottofy, D.D.S., is dean of the faculty, and he is assisted by Juan Arévalo (*Licenciado*), W. G. Skidmore, D.D.S., Frank R. Harkinson, D.D.S., Anna M. Sawyer, D.D.S., and Lloyd R. Hawley, D.D.S.

The organizers, in their circular of information, express the belief that “A necessity for such an institution exists in the Philippine Islands. First, because it opens to the better class of educated natives the door to a profession which has hitherto been closed to them. Second, it enables Americans who have taken one or more courses in medicine or dentistry in the schools of the United States, and who are now unable to complete their education, to do so. Third, it will afford an opportunity to other young men who have come to these islands, and who have elected to remain here, to obtain a professional education.”

OFFICIAL REPORT OF THE THIRD INTERNATIONAL DENTAL CONGRESS.

THE official report of the Third International Dental Congress is now being printed. It is in three volumes, the price being thirty-francs for the complete work.

As the edition will be limited, those who desire to secure copies are requested to communicate at once with M. Viau, treasurer of the Congress, 47 Boulevard Haussmann, Paris, or subscriptions sent to the editor of the DENTAL COSMOS will be promptly forwarded.

BIBLIOGRAPHICAL.

PRINCIPLES AND PRACTICE OF FILLING TEETH. By C. N. JOHNSON, M.A., L.D.S., D.D.S., Professor of Operative Dentistry in the Chicago College of Dental Surgery. Philadelphia, The S. S. White Dental Mfg. Co.; London (Eng.), Claudius Ash & Sons, Ltd., 1900.

This work is an elaboration of a series of articles which appeared from the pen of the author in the DENTAL COSMOS, and which are now presented with some amplification in book form. The readers of the DENTAL COSMOS are therefore to a considerable degree familiar with the methods which the author regards as most successful for the mechanical treatment of dental caries. With respect to no department of our work is there likely to be a greater diversity of opinion than upon the one under consideration. Individual operators will have each their own opinion as to the most successful method for attaining the common end of saving carious teeth, and consequently criticism of the methods advocated in the work under consideration must necessarily arise. And it is well that it is so, for out of proper criticism will come the stimulus to renewed study and investigation of this important problem, and this will bring us nearer and nearer to the ideal in this essential department. Much has been written upon the subject of filling teeth, but, taken altogether, we know of no work on the subject which has so much to commend it as this one. On every page it bears evidence not only of mature thought, but of being also the work of a trained teacher.

Whatever exceptions may be taken to individual procedures, no exception can be taken to the lucid exposition of principles and methods and the high teaching value of Dr. Johnson's work. It is systematic and orderly in its arrangement of data, the procedures are developed upon a rational foundation, and it is a book which the student, even though he were a novice, could follow with no danger of misunderstanding the author's instruction. It is this quality of the book which more than anything else will commend it as a text-book for students. The problem of cavity formation for the retention of gold fillings, particularly those involving the approximal surfaces of the masticating teeth, shows the strong impression which the author has received from the teachings of Black and others who have founded their practice upon the principles advocated by the same investigator. Whether the advocates of "extension for prevention" and of cavity preparation with reference to withstanding the forces of mastication have clearly

grasped the teachings of Dr. Black in all cases is questionable. A considerable number of practitioners of many years' clinical experience hesitate, as the result of that experience, to sacrifice sound tooth-structure to the extent which the extreme advocates of extension deem necessary.

With respect to this department of the work and the influence of the principles involved in determining cavity form, the greatest amount of criticism is most likely to arise. It would, perhaps, in view of the somewhat unsettled state of our affairs in regard to this matter, have been a desirable addition to the work in question if the author had developed still more fully the reasons which have led to the adoption of the principle contained in the phrase "extension for prevention."

Apart from this, we know of no better publication on the subject to place in the hands of the student, nor one which is better calculated to develop systematic and rational methods of treatment than the work in question.

A PRACTICAL TREATISE ON ARTIFICIAL CROWN- AND BRIDGE-WORK AND PORCELAIN DENTAL ART. By GEORGE EVANS. Sixth Edition. With 651 Illustrations. Philadelphia, The S. S. White Dental Mfg. Co., 1900.

Evans's "Crown- and Bridge-Work" has been before the dental profession for the past twelve years, during which time it has passed through six editions, and each succeeding one has been thoroughly revised and brought up to the existing state of the art of which it treats. It has been accepted as a text-book in dental educational institutions, and used as a work of reference by practitioners throughout the world. The popularity of the book is a fair index of its value as a trustworthy authority and guide in the important department of dental art with which it is concerned. The author has constantly kept in view the fact that crown- and bridge-work is a department of dental art which is constantly undergoing a change by the development of new methods, which in many cases are superseding procedures which for a time have held sway. In the work of revising the several editions these obsolete methods have been eliminated and the desirable advances have been included. Two valuable results have thus been attained: The student has at no time been confronted and puzzled with a multiplicity of impractical methods, and the work has always been kept abreast of the latest advancement of the art.

The present edition, like its predecessors, has been thoroughly revised, and a notable addition has been made with respect to the subject of porcelain dental art. The growing importance of this

feature of dental practice has been recognized by the author to the extent that a separate section on that subject has been added, and the principles and technique of the various porcelain processes fully described therein. In its present revised form there is no reason why the work should not easily maintain its foremost place as a reliable text-book upon crown- and bridge-work, serving as a trustworthy guide both to the student and the practitioner.

OUR TEETH: HOW TO TAKE CARE OF THEM. By VICTOR C. BELL, D.D.S. (Young America Library Series: No. 1). New York, Young America Publishing Co., 111 Fifth avenue.

This little primer of seventy pages is a very creditable attempt to put useful knowledge concerning the teeth into a form understandable by children, and is intended for their instruction in the school-room in connection with the general instruction which is given in some of the elementary school courses in physiology and hygiene. The treatment of the subject is extremely simple, and should be within the easy comprehension of young children, even those younger than the pupils for whom it was evidently prepared.

The illustrative examples introduced with a view to impress upon the child's mind the features which it is important for him to know concerning the physiology, anatomy, and hygiene of the teeth are well chosen and pertinent. A number of grammatical errors and errors of fact mar the work. For example, "Milk is a good food, but it is better for the teeth after it has been boiled than when left uncooked," is a statement which, unsupported by further explanation, is of questionable accuracy. Again, "Our teeth will let us have all the eggs we want, but they like them best soft-boiled," is a questionable putting of the value of eggs as a tooth-building material; and when the author says meat should always be well cooked, it would seem necessary that an explanation should be given as to why the meat should be well cooked and the egg not. It is hardly a fair recognition of a child's intelligence to indulge in rhetorical personification, as the author frequently does in speaking of the teeth, as, for example, "We may have all the fish we want, say our teeth, if we only eat what is fresh and sweet." Nor do we think it can be proved that the "pretty red color of the cheeks and lips of the Irish are" in any large degree "due to their habit of eating potatoes." We have always been inclined to believe that climatic conditions were the factor. We have searched in vain for the meaning of the illustration on page 20, which apparently represents a young child sitting in an arm-chair smoking a cigarette, though of course the author could not have intended that. A state-

ment like the following should have no place in a book of this character, viz (referring to tartar): "It affects saliva and makes food hard to digest." The child should be made to understand in what way it affects saliva and makes food hard to digest. Direction is given to use lime-water as a mouth-wash, and if the taste is unpleasant "a few drops of cologne or oil of rose may be added to it." Every chemist knows that the result would be the formation of a lime soap with the oils contained in the cologne, which would render lime-water practically inert. On page 25, in describing a mouth-wash, the word antiseptic is used, but no explanation of the meaning of antiseptic is given. The child is told that birds eat gravel and sand "to make their food digest," whereas they eat it to comminute the food and prepare it for digestion. The question is asked, "Why does a dog keep on gnawing his bone after the meat is all gone?" with the answer, "He does it to keep his teeth clean and strong," which implies a degree of canine intelligence and an appreciation of sound dental organs upon the part of the dog for which we have not given him credit heretofore. We had always supposed that he gnawed the bone for the same reason that he ate the meat from it,—because he liked it.

The expression, "Feel of your front teeth," is a vulgarism which should be omitted. Its errors and inaccuracies of the character quoted lead us to the belief that the work should be thoroughly edited before a new edition is issued. They mar what would be otherwise a very creditable and useful little book, and one which in revised form would constitute an excellent and trustworthy source of instruction to young school-children in this very important department of hygiene. The pictures and illustrations throughout the book are very well selected, and add much to the teaching value of the work.

We are informed that a corrected edition will be shortly issued.

OBITUARY.

HENRY GERHART, D.D.S.

IN our previous issue we made brief mention of the death of Dr. HENRY GERHART, which occurred at his home, in Lewisburg, Pa., on Sunday, January 20, 1901. His illness was not generally known to his colleagues, and the announcement of its fatal termination came to them as a surprise and shock. Among the profession of Pennsylvania Dr. Gerhart was a unique figure; gentle and quiet in manner and bearing, he was nevertheless a tower of strength in the defense of his beliefs or in advocating whatever cause had enlisted his sympathetic endeavor. In debate he was a

logical and powerful antagonist, but his contention was always for the truth as he saw it; and his treatment of his opponent was invariably fair and courteous, even when most forceful. No man could harbor resentment toward him, for his differences with men were never personal, and it is perhaps safe to say that no practitioner in Pennsylvania had a greater number of friends among his professional acquaintances than had Dr. Gerhart. His probity and integrity were above question or reproach. So fully was this recognized that many and important positions of trust, both civil and political, were committed to his care, and in certain cases without regard to differences of political creed.

Dr. Gerhart was a scholar of high attainment. He received his early education in the common schools, and later graduated from the Central High School of Philadelphia. But his interest in the acquisition of knowledge was perennial, and upon his early foundation he built up by constant study and observation a culture which was as rare as it was thorough. His mind was acutely clear and active; every event, all phenomena, which attracted his notice received thoughtful and intelligent consideration. His studious interest in human affairs led him to enlarge the field of his observations by extensive travel, and his writings, embodying the results of his observations upon these occasions, are models of philosophic reasoning, rendered in graceful and elegant English.

His professional life was successful not only in the ordinary material sense, but in the highest and best meaning of that term. After having learned the trade of machinist, he studied dentistry in the office of an older practitioner, and in 1857 opened an office in Lewisburg, where he lived and practiced until his death.

In 1869 he was granted the degree D.D.S. by the Pennsylvania College of Dental Surgery at its commencement held February 27th of that year. He was an active and interested member of the Pennsylvania State Dental Society, of which he was one of the organizers, and was several times elected its president. He was, under the old dental law of his state, chairman of the Board of Dental Examiners, and when the law of 1897 was enacted was again recommended by the State Society for reappointment by the Governor. Upon receiving the appointment he was at once elected president of the new board, a position which he held until his decease. He presided over the deliberations of the board with rare skill and judgment. His experience as a man of affairs, his knowledge of men, his well-stored mind, his logical reasoning faculty, and, above all, his sterling integrity, made him a wise, efficient, and safe counsellor.

The dental profession, especially in his native state, have lost a powerful influence for good in the death of Henry Gerhart, but his loss will be felt far outside the limits of his professional endeavors. Dr. Gerhart's interest in education was by no means confined to that of his own profession, for he carried his activities into wider fields. Coincident with his going to Lewisburg to begin the practice of dentistry he identified himself with the interests of Bucknell University, of which he was, in 1860, elected a trustee, and in which position his sound business judgment and ideas upon educational problems were of signal service to the institution. He was active also in the work of the church organization to which he belonged, and in which his helpfulness, both by precept and example, was one of the most marked features of his full and active life. His friend-

ship was helpful and inspiring. No man could know Henry Gerhart and not love him. He was a living refutation of the pessimistic idea, and an energizing and uplifting force to all with whom he came in close contact. A splendid type of the cultured Christian gentleman.

Dr. Gerhart was born in Lancaster county, Pa., April 8, 1827. In 1851 he married Miss Susan May Kennedy, who, with two sons and two daughters, survives him.

DR. H. D. COGSWELL.

DIED, at San Francisco, Cal., July 8, 1900, Dr. HENRY D. COGSWELL, in his eighty-first year.

Henry D. Cogswell was born in Tollandville, Conn., March 3, 1820. He entered the office of Dr. Hull, at Pawtucket, R. I., as a student in dentistry in 1841; and practiced in Pawtucket and Providence for several years. In 1843 he began to experiment with vacuum plates for artificial teeth, and in 1848 he had the records of the patent office examined, and having assured himself that no such device had ever been patented filed a caveat with the intention of taking out a patent. His office in Providence was destroyed by fire in 1848, and he went to California. He did not return for four years, and so lost the opportunity of taking out a patent on the air chamber or vacuum plate.

He returned to San Francisco and resumed the practice of dentistry, in which he achieved a notable success. A widow survives him.

DR. SAMUEL H. GISH.

DIED, August 2, 1900, in Janesville, Wis., Dr. S. H. GISH, in his eighty-second year.

Dr. Gish was born in Lancaster, Pa., April 27, 1819. He graduated from the Philadelphia Medical College in 1851, and practiced medicine for several years in Elizabethtown, Pa. He went to Janesville in 1866, where he opened a dental office, and soon gained a reputation for skill in his profession. He continued to practice actively until within a few months of his death. Dr. Gish was married twice, in 1849 to Miss Sarah Frederick, who died in 1864, leaving five children; in 1868 he married Miss Jennie M. Neil, who survives him.

Dr. Gish was deeply interested in researches among old ruins of Southern Europe, the Holy Land, and Egypt. He made a special study of ancient history and chemistry, and was well informed on all the leading questions of the day.

DR. A. W. BUCKLAND.

DIED, at his home, Woonsocket, R. I., of heart failure and bulbar paralysis, August 24, 1900, ALPHONSO WATSON BUCKLAND, D.D.S.

Dr. Buckland was born June 19, 1843, at Washington, Van Buren county, Iowa. When he was about six years old his parents returned to their home in the East, and located at Broad Brook, Conn. Here he spent his boyhood days helping on the farm in summer and attending school in the winter months. Later he attended a seminary at East Greenwich, Conn., and at Mt. Weslyn, Mass. In 1866 he married Helen Augusta Marble, of Southbridge,

Mass. After several essays in business he entered the Philadelphia Dental College, from which he graduated in 1871, when he established himself in dentistry in Woonsocket, R. I., where he continued with successful practice until a year before his death. He distinguished himself in his profession, and became a member of the American Academy of Dental Science and of the Rhode Island State Dental Society, and for nine years was a member of the Rhode Island Board of Registration in Dentistry.

During his life in Woonsocket Dr. Buckland became interested in many branches of business enterprise, and his business energy and intelligence assured him a leading part among any set of associates. At his death he was president of the Woonsocket Electric Machine and Power Company, president of the People's Savings Bank, a director of the Producers' National Bank, and one of the owners of the Woonsocket Lumber-yard and the Buckland and Clark Building, in which the Woonsocket Post-office is situated. He was also director in several Western mining companies. He was prominent among the Masons, having been commander of the Woonsocket Commandery, No. 23, K. T., and a member of several other societies, including Washington Lodge, No. 70, A. F. and A. M., of Windsor, Conn.; Washington Lodge, Knights of Honor, Hope Lodge, N. E. O. P., and the local lodge of Good Fellows.

Dr. Buckland's wife and three married daughters survive him.

DR. J. W. CLOWES.

DIED, September 9, 1900, of general debility, J. W. CLOWES, D.D.S., at his home in New York, in his eightieth year.

Dr. Clowes was one of the best-known dentists of New York, and the last surviving member of the first class of the Baltimore College of Dental Surgery. He was born in Cohecton, Sullivan county, N. Y., March 13, 1821, and in 1838 began to study dentistry in the office of J. Smith Dodge, in New York, and remained with him until the fall of 1839. He entered the Baltimore College of Dental Surgery, in the first class, but did not graduate with it. On June 10, 1842, he opened a dental office in New London, Conn., and continued practice in that city until the fall of 1849, when he went to Columbus, Ga., to spend the winter. Returning he located in New York city in the spring of 1850, and remained in practice until about a year previous to his death. The record of these years tells of earnest effort and conscientious and skillful work which gained for him respect, reputation, many grateful patients, and well-earned honors which his brother practitioners gladly accorded him.

DR. VOLNEY McALPINE.

DIED, at Butler, Pa., September 1, 1900, in his seventy-first year, Dr. VOLNEY McALPINE.

Dr. McAlpine was born in Crowland, Ontario, Canada, May 27, 1830. About 1862 or 1863 he entered upon the practice of dentistry in Welland, Ont. In 1865 he removed to Petroleum Center, Pa., and for a number of years practiced in that and neighboring towns. In 1888 deceased went to Alaska, remaining a year, and upon his return to Pennsylvania located at

Butler, where he resumed practice which he only relinquished when attacked by his last illness.

Dr. McAlpine was a man of scholarly attainments, and ranked high among his colleagues. His wife and six children, of whom two are dentists and two physicians, survive him.

DR. J. D. HUNTINGTON.

DIED, September 15, 1900, at Watertown, N. Y., Dr. JOHN D. HUNTINGTON, aged seventy-three years.

Dr. Huntington was born in Watertown, February 11, 1827. In 1835 his father removed with the family to Geauga county, Ohio, and a few years later, having lost his property in the panic of 1837, he again moved, settling in Caldwell county, Mo., then the Western frontier of civilization. He afterward moved to Commerce, Ill., the town afterward called Nauvoo by the Mormons. The death of the mother broke up the family in 1840, and John for a time made his home with Joseph Smith, the founder of Mormonism. He here came in contact with Brigham Young and many other prominent Mormons. In 1846, his father having died, the subject of this sketch returned to Watertown, his native place, and having learned the printing trade while at Nauvoo, engaged in the newspaper business, becoming in 1857 the proprietor of a local paper. Afterward he became manager of the telegraph business in Jefferson county.

In 1861 he began the study of dentistry, and when he retired from practice, a year before his death, he was the oldest practicing dentist in northern New York. He was active in dental association work, having been elected president of the Fifth District Dental Society in 1875. His energetic nature led him to take vigorous hold upon business and upon political reforms; he espoused the cause of the Prohibition party, and was a delegate to every convention of that party since 1884, and was repeatedly nominated for various offices. His memory is stamped upon the history of his native town from the day it was an unimportant village to the present time. He did not seem to grow old as the years passed over him, never losing interest in the young, of whom he was always glad to be a companion and a friend.

In 1851 Dr. Huntington married Adelaide L. Danks, who survives him, as do his two sons, Dr. W. T. Huntington and J. Fred. Huntington.

DR. JOSEPH LATHROP, SR.

DIED, in Stewart, Mich., December 4, 1900, of pneumonia, Dr. JOSEPH LATHROP, SR., aged sixty-six years.

Dr. Lathrop was born in Springfield, Mass., but in early youth went to Michigan, graduating from the Romeo branch of the Michigan University in 1849. For some years he was engaged in mercantile business in Brattleboro, Vt., and in Clinton, Mass., then in the jewelry business in East Saginaw, Mich. Entering the practice of dentistry in Detroit in 1860, he achieved a gratifying success in his chosen profession, and was very active in dental society work.

He was ex-president of the Michigan State Dental Association, a member of the Detroit Dental Society, the National Dental Association, the Detroit

Sigma Delta Fraternity of the University of Michigan, and of the Morning Star Lodge, F. and A. M., of Worcester, Mass.

Dr. Lathrop leaves a widow and three children,—Dr. Joseph Lathrop, Jr., Mrs. Cook, and Miss Ada M. Lathrop.

DR. T. O. WALTON.

DIED, December 21, 1900, from heart failure, in his sixty-seventh year, THOMAS O. WALTON, D.D.S., of Annapolis, Md.

Dr. Walton was the son of Jesse Walton, of St. Mary's county, Md., and was born September 24, 1834. He graduated in 1856, from the Baltimore College of Dental Surgery, and the same year entered practice in Annapolis, where for forty-two years he held the post of dental surgeon to the Naval Academy. In 1863 he married Catharine Hopkins, of West River, Md., who survives him.

Dr. Walton was a Mason, and at the time of his death was a director in the Farmers' National Bank of Annapolis. He was a man of means and of the most kind and friendly disposition. It was one of his greatest pleasures to perform kindly services to others, and he was very highly esteemed in the community, being popular with all classes.

DR. S. H. BURGESS.

DIED, at Eustis, Fla., from general senile decay, Dr. SAMUEL H. BURGESS, age seventy-four years.

Dr. Burgess was the son of Mr. Osman Burgess, of Springfield, Vt. He was one of a family of twelve brothers and sisters, all of whom except one grew up to mature life. He was born January 17, 1827. He entered upon the study of dentistry in 1848 as a pupil with Dr. Jonas Ball, of Nashua, N. H., and opened an office in 1852 at Lewiston, Me.; later he practiced for many years in Michigan. About fifteen years ago he moved to Eustis, Fla. In 1851 he married Lucy Williams, of Plymouth, N. Y., who survives him.

Dr. Burgess was widely known, not only on account of professional skill but for his kindly nature, which all recognized and loved. Reared in a Christian home, he was from early youth zealous in church work, and for more than threescore years lived a consistent Christian.

DR. LEWIS BUFFETT.

DIED, January 28, 1901, at Easton, Md., from hemorrhage of the stomach, LEWIS BUFFETT, M.D., D.D.S., in his sixty-fourth year.

Born near Albany, N. Y., in 1837, Lewis Buffett studied for a time in the office of a dentist in Troy, N. Y., and then attended the Pennsylvania Dental College, from which he was graduated in 1863. After graduation Dr. Buffett went to Cleveland and took a course in medicine at the Western Reserve University Medical Department, and was duly graduated from that institution. He then occupied the chair of dental surgery and continued a professor of the institution for a number of years, at the same time attaining a high rank as a dental surgeon. He was a member of the Ohio State Dental Society and the Northern Ohio Dental Association.

In 1867 he married Anna Perry, of Schaghticoke, N. Y. She died in 1882, leaving a daughter, Mrs. Lottie Smith, now living in Washington, D. C., and a son, Norman Buffett, of Cleveland. In 1884 he married again, his second wife being Mrs. Eliza Foster, of Canada, who survives him.

In 1888 Dr. Buffett left Cleveland and bought a large farm on the shores of Chesapeake Bay, near Easton, Md., on which he lived till his death, going into Easton every day to attend to his dental practice.

DEATH OF DR. LECAUDEY.

INTELLIGENCE has been received of the decease in Paris of this distinguished representative of our profession, in his seventy-fourth year. He had not been in active practice for some time. Dr. THEODORE EMMANUEL LECAUDEY was a member of the Academy, and a chevalier of the Legion of Honor; he was honorary president of the Dental Association of France, as well as being honorary president of the Third International Dental Congress. A more extended notice of this venerable colleague must be reserved for a later issue.

SIR EDWIN SAUNDERS.

WE learn too late for extended notice in this number of the death of Sir EDWIN SAUNDERS, the celebrated English dentist, who for many years filled the post of dentist to the royal family of England.

HINTS, QUERIES, AND COMMENTS.

DEATH THROUGH MAXILLARY EMPYEMA.—The following report of maxillary empyema extending to the brain with fatal result is furnished us by Dr. C. S. Parker, of Norfolk, Neb.:

Case of Benjamin B., age 35, German, with well-developed physique.

On the night of July 18 he was disturbed by pain in left cheek, and next morning noticed that his left eye was slightly swollen. He did nothing for a week, and swelling continued until his eye was entirely closed, when he consulted a physician, who told him that he had catarrh. At this time he had severe headaches and dull heavy pain over the malar process. On August 1 he consulted another physician, who immediately diagnosed antral abscess and brought him to me for treatment. At this time the left eyelids of the patient were swollen and purple, the malar process and the palatal process of the superior maxilla were bulged and very painful upon pressure. The only carious tooth was the upper first molar, the crown of which had been entirely destroyed by caries; the roots were loose and suppurating. Upon extraction a probe was easily passed into the antrum, from which quantities of fetid pus exuded. The opening was enlarged and thoroughly irrigated with three per cent. hydrogen peroxid in water. The physician at this time lanced the eyelid and evacuated about half an ounce of fetid pus; this gave relief. The treatment was continued for ten days, the patient washing out the sinus himself three times a day, and I thoroughly irrigating it once a day with H₂O₂ and solution of kino and myrrh; the tenth day he complained

of severe pains in the head and was very depressed. The physician told him the eye would have to be taken out, and he decided to go to a specialist, whom he consulted on the thirteenth. I treated the antrum as before until he left. The subsequent treatment I give in the specialist's own language:

"Benjamin B. came to me on August 14 with a suppurating sinus leading from the center of the left upper lid along the roof of the orbit to a depth of two and one-half inches. The eye was protruding and blind, with the vessels of the optic nerves small and the disk rather pale; he also had suppuration from the left antrum of Highmore. On enlarging the sinus and evacuating considerable pus from the orbit by a glass drainage-tube, the headache, which had been quite severe, improved very much; but on August 17, as the pain began to return and the pulse to get slow, I eviscerated the orbit, opened the frontal sinus freely, also the ethmoidal cells clear to the apex of the orbit. The orbital roof for a space of about two square centimeters was found wanting about half-way between the anterior and posterior borders of the orbit. There was no fistula here and no signs of any pus between the bone and the dura; the latter was covered with granulations. After this the patient had very little pain, except when the packing of the cavity was changed on August 19 and 21. This gave him severe pain, and was followed by slight and transient delirium. At other times his mind was perfectly clear, although the pulse was quite slow at times, once reaching forty-eight. His symptoms of brain-abscess were so unpronounced that I thought it best to defer exploring the brain; this proved to be a mistake, however. On August 23, with his mind perfectly clear and no localizing symptoms whatever, his respiration suddenly began to fail, and he died within a few minutes. The autopsy showed an abscess in the anterior part of the left frontal lobe containing nearly a half-ounce of fetid pus; this abscess had no well-pronounced limiting membrane, and it had broken through into the anterior horn of the anterior ventricle. During the time that he was here the antrum was irrigated thoroughly several times a day. His temperature ranged from $98\frac{1}{2}^{\circ}$ to 100° , being $99\frac{1}{2}^{\circ}$ nearly all the time."

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

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LIST OF UNITED STATES PATENTS PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING FEBRUARY, 1901.

- Feb.* 5.—No. 667,220, to WM. G. HUGHES. Dental engine.
 " 5.—No. 667,441, to WM. HARE. Dental mouth-prop and mirror.
 " "—No. 667,464, to CARL H. SEEGER and NICHOLAS DEDRICK. Dental tool.
 " "—No. 667,465, to CARL H. SEEGER and NICHOLAS DEDRICK. Universal joint.
 " 12.—No. 667,723, to FREDERICK A. L. MURDOCK. Artificial tooth.
 " "—No. 667,869, to CHAS. F. DAVIDSON. Surgical chair.
 " 19.—No. 668,321, to RICHARD W. SONNEX. Dental chair.
 " "—No. 668,373, to CHAS. P. FRITZ. Hand-piece.
 " "—No. 668,492, to CLIFFORD A. COBALT. Cusp press for tooth-crowns.
 " 26.—No. 669,031, to JOS. P. GOMES. Dental press.

THE DENTAL COSMOS.

VOL. XLIII.

PHILADELPHIA, MAY, 1901.

No. 5.

ORIGINAL COMMUNICATIONS.

THE MICRO-ORGANISMS OF DENTAL CARIES: A REPLY TO DR. CHOQUET'S CRITICISMS.

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AMONG the many criticisms that a recent paper of mine* has elicited, one† in particular has caused me considerable surprise, from the fact that the author has in some way or other misunderstood many important details in the paper he criticizes. Perhaps the meaning was not sufficiently clear; at any rate there is a considerable difference between my views expressed in various articles and those credited to me by Dr. Choquet in his criticisms. However, it is the prerogative of all scientific papers to be misconstrued, and as, from a casual glance through my paper, the argument may perhaps seem involved, it appears best on mature consideration to point out carefully some of the more serious instances in which the real facts of the case were not clearly understood by my critic.

It is far from my thoughts or intention to make anything in the nature of the personal attack that has been credited to me, or to adopt the *tu quoque* form of argument. My only desire is to dispel the illusions with regard to my ideas of dental caries and the organisms concerned therein that cannot fail to result from a perusal of Dr. Choquet's criticism; and in conjunction with such a repudiation we shall, I think, see that, so far from being antagonistic, the results published by Dr. Choquet are in some ways a corroborative witness, however unwillingly, of much I have already suggested.

*"Micro-organisms in Dental Caries," DENTAL COSMOS, March and April, 1900, vol. xlii.

†"Study of Certain Microbes in Dental Caries," DENTAL COSMOS, October, 1900, vol. xlii.

That such was perhaps the case has apparently crossed the mind of my critic, for although he commences his strictures on my paper with the startling statement that he "does not agree with the conclusions Mr. Goadby draws from his researches," he nevertheless finds after an exhaustive criticism that, except "in some few points," he agrees; and, moreover, actually corroborates two of the conclusions and admits having made no experiments relative to the third.

There are many passages difficult to reconcile one with another in Dr. Choquet's paper. For instance, he says (page 971) that after going carefully over my work he discovers that I go outside the limits of the etiology of dental caries by occupying myself "with the microbes found in the saliva and over the teeth." This is, for instance, the case with the *Leptothrix buccalis*."

The term etiology is, unfortunately, often used with a disregard of its special meaning, as "the science which investigates the causes of disease,"* be it of tooth or of muscle. In fact, as Dr. Pye-Smith used to say, "etiology is a chat about the pathology of a disease." On the other hand, *Leptothrix* is a class term for a genus of thread-forming organisms, and among such species as have been isolated many are acid-producers when carbohydrate food is present. To place "*Leptothrix*," therefore, whatever that protean form may be, outside the pale of etiology of dental caries is a somewhat startling proposition to make even on *à priori* grounds.

But my critic would further exclude from the etiology of caries "microbes found in the saliva and over the teeth," a curiously strange limitation of the field of inquiry of the etiologist. But we find later in the criticism that the author has changed his view, and definitely states that the question of caries presents two stages: (1) Decalcification of the hard external portions of the enamel; (2) penetration of living tissue by these living organisms (page 974). And he moreover states, in referring to the special organisms he claims to have isolated, that they "originate in the saliva, and that in the course of time it will be possible to identify them by means of cultures and growth in the laboratory" (page 976).

Consider the passages in whatever way one can, Dr. Choquet places us on the horns of a dilemma, for either (a) "the microbes found in the saliva and over the teeth" have no relation whatever to dental caries or its etiology, or (b) Dr. Choquet proposes to adopt a course he objects to and considers outside the question. He is therefore in the unique position of criticizing his own criticism.

Among other questions, the use of standard media is touched upon by my critic, and in many points he restates the question as alluded to in my own paper. It seems, however, that my meaning was not sufficiently clear, inasmuch as the references given have been quite ignored. My critic will find, if he will please refer, that particular reference was made to this point, and it was definitely stated (page 202) that three cubic centimeters of normal sodium hydrate were added to each liter of the medium over and above the amount required for neutralization, when litmus is employed as the indicator.

**Times Dictionary.*

If Dr. Choquet will again refer to the passage the meaning of which has not apparently been quite clear, he will find that I say "standard media and processes must always be adopted, *as well as special methods, which must always be clearly stated*" (page 202); that is to say, when an organism is described for the first time its growth on the ordinary laboratory media must be given, and then, if any special media have been used or if the growth on any special medium is particularly characteristic, besides the description of the cultural characters on such a medium the composition of such medium and the mode of preparation should be given. Now, although Dr. Choquet criticizes my paper so pointedly, and is also at such considerable pains to point out that he gives the method of preparation of his special media, it is surprising that he should nevertheless omit to mention the most important detail pointed out above; in fact, we can find no information as to the reaction of his media beyond the passing remark that it is *feebly alkaline* (page 976); moreover, he does not state which medium is which. The only one designated is the bouillon A; the others, B, C, D, are left to the imagination of the reader, no reference being given to any other paper where, it is possible, the descriptions are given.

From the few details given of the process of media-making, his nutrient media must vary within considerable limits, and the method of sterilization (page 973) for fifteen minutes in the autoclave, with no further sterilization in the tubes, is hardly sufficient to insure sterility. Then, again, the sterilization of gelatin in the autoclave is notorious for its unequal results, a variable proportion of the gelatin being converted into gelatin-peptones by the process. Perhaps this is the reason why twelve per cent. of gelatin is added instead of the usual ten per cent.

Dr. Choquet does not tell us how he filters the seven per cent. agar (gelose), as most observers find two per cent. enough to manipulate, and with excellent results.

There are many other points in connection with this question, but enough has been said to demonstrate that Dr. Choquet does not give us a complete description of his methods, and what he does give differs in many details from the procedure adopted by most bacteriologists. Perhaps it is not quite fair to pass judgment on incomplete data, and I hope Dr. Choquet will give full descriptions in a subsequent paper.

With no discourtesy to Dr. Choquet or to the admirable work of M. Grimbert which he quotes, the claim of priority can hardly be admitted to M. Grimbert's paper, nor does Dr. Choquet's rhetorical flourish of "long before" convey a meaning in strict accord with fact.

While we are discussing the question of culture-media, a matter of much importance, as Dr. Choquet rightly observes, let us refer again to the methods upon which this observer bases some of his "characteristic reactions," as the technical term goes.

He says (page 970), "The bio-chemical are, in our opinion, those properties which will greatly facilitate this distinction and identification. It is on this point that Mr. Goadby contradicts himself by leaving out the chemical questions."

Now, with all due respect to Dr. Choquet's opinion, my own experience is that the chemical questions are often misleading, and that these chemical reactions often undergo alteration, so that reliance upon them alone or principally is most elusive. What astonishes me is that Dr. Choquet himself should consider them of such importance, when he tells us in his introduction that the organisms he has isolated have entirely changed in these very chemical peculiarities since they have been isolated. Thus, he says, "They develop very slowly in the culture-media generally employed; nevertheless in the course of time and as a consequence of their development, which for five years has taken place out of their own medium, they have gotten acclimated and now grow with great rapidity. The morphological characteristics have not suffered any change, while the chemical reactions, weak at first, are to-day entirely changed in one way or another." The passage is quoted in full to avoid any uncertainty as to its origin, and we see that the chemical reactions upon which Dr. Choquet lays such stress are scarcely reliable data upon which to depend for identification. With regard to the latter part of Dr. Choquet's remark, the only chemical reactions that Dr. Choquet gives other than those he will find in my paper are the fermentation of several uncommon carbohydrates, bodies that are extremely difficult to obtain in a pure state. In view of this, and from the fact that the fermentative changes are apt to vary considerably, I did not think a description of their fermentation by the organisms described in the paper Dr. Choquet criticizes germane to the question. One could with as much propriety criticize Dr. Choquet for not giving the action of his organisms on, say, alkali albumin and ferrous lactate, to mention but two of the media often used, as to object, as he does, to my not giving the reaction on certain special carbohydrates. The alteration in the chemical activity of an organism is a common occurrence; the pathogenicity, probably another phase of the chemical question, is known to vary in a remarkable way with many organisms, while by subjecting an organism to alterations in its environment profound changes may be produced in its reactions. It seems remarkable that, having this in his mind and referring, as my critic does, to Gissard's work on *B. pyocyaneus*, and in view of his own experience, he should still regard the chemical reactions as of such importance.

Now, the change from the dentin under a filling to a culture-medium in the incubator may perhaps be less than subjecting an organism to a temperature of 40° C. for five minutes, yet it is undoubtedly a change in its environment, and, moreover, a greater one than transferring an organism from the superficial layers of carious dentin to an incubated culture-medium; that is to say, from a condition of anaerobiosis to one of free access of oxygen. A paper read before the International Congress of Dermatology (Paris, 1900)* is particularly interesting in this connection. The authors show that by growing a given quickly-liquefying staphylococcus under

*Congress Dermatol., Paris, 1900. Paper by J. W. Eyre and J. Galloway.

strictly anaerobic conditions the rate of liquefaction is reduced by one-half.

Now, Dr. Choquet's organisms were presumably left under fillings, and remained there during the five years that the fillings were in place, their environment being for all practical purposes anaerobic. At the end of five years the organisms were suddenly transferred to new surroundings, and at first grew slowly. As they became accustomed to their new conditions more rapid growth occurred, and their dormant qualities became renewed. One cannot help being struck by the analogy.

I do not propose to enter here into a discussion of the experiment on the sheep that Dr. Choquet conducted with so much skill, but it is unfortunate that only one tooth was operated upon while the animal was on the table, and that no control cavities were made under the same conditions but not inoculated with the culture. The absence of this control experiment raises the uncomfortable suggestion of coincidence. On the other hand, there does not appear much advantage to be gained from the use of a living animal, as caries produced artificially and caries in a dead tooth in the mouth present no very striking differences; moreover, teeth with dead pulps do not appear to be more liable to primary caries than teeth with living pulps, while caries in a dead tooth and caries in a living tooth are quite similar processes. It is also difficult to suppose any bactericidal action of normal dentin.

Among other matters which my critic charges me with is the inability to test for indol. Thus he says, "The author tells us that none of the microbes that he has studied have produced indol in the peptone solution; but this is not extraordinary when the reagent he has used to demonstrate the presence of indol is composed of sulfuric or nitric acid alone, ignoring the potassium *nitrate*, which is not only useful, but indispensable to obtain the red coloration peculiar to indol."

If Dr. Choquet will please refer to the article he quotes,* he will find the following passage: "Indol—a six days' culture on peptone water gives no coloration with pure sulfuric acid or yellow nitric acid." Now, it is a common bacteriological fact that the cholera-red reaction at one time thought to be given by the Koch spirillum alone is also given by certain other organisms. This reaction, a fine red color, is produced when pure sulfuric acid is added to a peptone-water culture of the spirillum in question without the addition of any nitrite, the color being due to the interaction of the indol with the *nitrite* also formed by the organism. In the passage quoted above, therefore, it is clear that the organism does not produce *indol* and *nitrite* together. But it is an equally common fact of chemical knowledge that commercial (yellow) nitric acid contains a quantity, small perhaps, of nitrites as an impurity; even commercial sulfuric acid contains enough to give the reaction. If, therefore, yellow nitric acid is used, the indol reaction occurs just as well as if two drops of a 0.005 solution of potassium or sodium *nitrite*

**British Dent. Journ.*, v, 18.

are first added, when indol alone is present. It will be seen, therefore, that the organism referred to does not produce indol alone.

Dr. Choquet, however, entirely misses the point of the reaction when he expresses surprise at my not using potassium *nitrate*, without which, he says, the reaction does not occur.* This is incorrect, as Kitasato,† who first demonstrated the reaction in connection with the *B. coli*, which gives the reaction as opposed to *B. typhi abdominalis*, which does not, describes the indol test as follows: 1 c. c. of a solution of sodium nitrite (0.02 gm. per 100 c. c. of water) are added to the broth culture to be tested; 2 c. c. of pure sulfuric acid are also added. If indol is present, the nitrous acid combines with it to form an amide, the red nitroso-indol.

Nitrate, potassium or sodium, is of no use at all.

If my critic will try the reaction for himself, using two broth tubes of an organism known to produce indol, adding to one 2 c. c. of yellow commercial nitric acid and to the other 1 c. c. of a 0.02 per cent. solution of potassium nitrite (not nitrate), and 3 c. c. of pure sulfuric acid, he will find that there is no appreciable difference between the reactions. After a few trials he will find that the nitric acid is the most convenient reagent to use. Perhaps the most charitable explanation of Dr. Choquet's mistake is that of a printer's error.

With regard to the question of glycerin as an addition to culture-media, when Dr. Choquet says, "Although glycerin is not generally considered among the nutritive materials used in bacteriology, we have made a trial of gelatin pepto-glycerized at one per cent.," he has evidently forgotten that glycerin has been in use ever since Roux and Nocard,‡ working in Pasteur's laboratory, used glycerin-agar for the cultivation of the tubercle bacillus. Since then all sorts of media have been made containing glycerin, and are in common use; in fact, in our own laboratory, in the cupboard containing the ordinary laboratory media in use, there is a stock of glycerin-agar, glycerin-gelatin, glycerin broth, and glycerinized potatoes; and if Dr. Choquet will refer to Sternberg's "Bacteriology," page 43, he will find the generally accepted method of preparing this widely-used medium. Dr. Choquet will also find in one of the papers he criticizes that mention is made of glycerin-agar.§

When my critic says (page 975), "We are among the first to recognize that it is impossible to isolate a microbe by microscopical examination alone," the passage requires no further criticism than its quotation.

Dr. Choquet is laboring under an entire misconception when he makes the statement that, "We do not admit, then, that Mr. Goadby should claim to be the first to discover the presence in the mouth

*[It should be stated that in the sentence here referred to (see Dr. Choquet's paper—DENTAL COSMOS for October, 1900, p. 970), the word "nitrate" was a printer's error for *nitrite*, as corrected in the issue for November, 1900, p. 1335.—ED. DENTAL COSMOS.]

†*Zeitschr. für Hygiene*, Bd. vii, 1889.

‡*Annales de l'Institut Pasteur*, t. 1, p. 19. See also Palowski, *Ann. de l'Inst. Past.*, 1888.

§*Trans. Odont. Soc.*, June, 1899.

of the streptococcus, be it the *Streptococcus brevis* or any other." I entirely and emphatically deny that either Dr. Washbourn or myself have ever made any such ridiculous assertion, and if Dr. Choquet had taken the same trouble to read the paper that he has taken to find points to criticize he would not have rendered himself liable to any such misconception. In order to make this point clear once for all, I parallel two passages, one the criticism made by Dr. Choquet and the other a quotation from the paper in which Dr. Washbourn and myself published our work on the streptococcus of the mouth.

"We do not admit, then, that Mr. Goadby should claim to have been the first to discover the presence in the mouth of the streptococcus, be it the *S. brevis* or any other."—DENTAL COSMOS, October, 1900, p. 971.

"*Lingelsheim* was the first to point out that the streptococcus obtained from the normal mouth differed from the *Streptococcus longus* in three points. It was not pathogenic for mice and rabbits, it rendered broth turbid, the chains on this latter medium were shorter than those of the *S. longus*, and it caused a slight liquefaction of gelatin. *He considered it a distinct species and called it the Streptococcus brevis.*"—Trans. Odont. Soc. Great Brit., June, 1896, p. 259.

Further, in the DENTAL COSMOS, March, 1900, I say, "I have observed a streptococcus in five hundred different mouths, and in one hundred and fifty I have isolated the *Streptococcus brevis* of von Lingelsheim in pure culture."

In no way, therefore, do Mr. Washbourn or myself ever claim to have discovered the presence in the mouth of the streptococcus, be it the *Streptococcus brevis* or any other; and we entirely repudiate Dr. Choquet's insinuation. If Dr. Choquet will refer to the original paper he will find the results of certain inoculation experiments which he has overlooked.

In another passage Dr. Choquet says, "Mr. Goadby criticizes the theory upheld by Dr. Williams's remarkable work as to the decalcification of the enamel through the rapid deposit of micro-organisms over the surface of the teeth; but to-day the chemico-parasitic theory is not only admitted, but is also recognized as the only explanation. This theory is certainly rational. It is true that the demonstration was not complete; he did not cultivate all the species on artificial media, but, just the same, the theory has all the chances of being accepted."

Now, as a matter of fact, I did not criticize the theory, as Dr. Choquet will see for himself if he will refer to the passage. What I did say was that Dr. Williams's complete demonstration was not a complete one, inasmuch as he had only tested the acid production of three organisms already well known to produce acid. Dr. Choquet himself admits that the demonstration was not complete, which was the whole of my contention. Dr. Choquet, therefore, upon his own showing, is much opposed to the chemico-parasitic theory and criticizes it, if we accept his remarks upon this point.

The only explanation is that Dr. Choquet has not quite comprehended my meaning, which I regret has been so obscure that, so far

from understanding the paper as dealing particularly with various problems of the chemico-parasitic, or, more properly, bacteriological theory of dental caries, my critic imputes to me the antithesis of my contentions. The last sentence of the passage quoted above gives the impression that its author does not think it essential for a theory to have all its premises proven. Dr. Choquet thinks, and rightly, that the organisms whose action on decalcified dentin was noted should also have been tried on normal dentin, and if he will again refer to the Transactions of the Odontological Society for June, 1899, he will find that the question was not neglected, as he thinks, for it is expressly stated that "no digestion of normal hard dentin was effected, the tissue always requiring softening by acids before the digestive enzymes would attack it." These enzymes have since been isolated by precipitation, and dentin (decalcified only) and gelatin digested by them. There was no effect on normal dentin.

Space prevents my touching upon many other points in Dr. Choquet's criticism, but enough has been said to show that my meaning has failed to be entirely appreciated by him, although I am still at a loss to apprehend how the misconception has arisen. Dr. Choquet, with his particularly expressed fairness of criticism, cannot fail to admit that the foregoing simple statement of facts in no way departs from that courtesy extended to me in his criticism of my work, and he will, I am sure, appreciate that my explanations of the passages he has failed to understand rescue him from an unenviable position in which he would be the last to wish to remain. I hasten to assure Dr. Choquet that I fully appreciate his disclaimer of "systematic defamation," and at the same time he will undoubtedly see that I have disregarded much of a controversial nature.

Although the criticism we have just discussed in certain points unwittingly confirms some of my own work, it deals with a somewhat different aspect of the question, and a few words of explanation may not be out of place. My own work has been mostly upon primary caries,—that is to say, caries which had at no time been under conservative treatment,—while Dr. Choquet's is based upon the examination of three teeth in which caries had occurred under fillings carefully inserted in the routine way,—hence recurrent and not primary caries. It follows, then, that the organisms obtained from under the fillings were living under considerably different conditions from those organisms which have been obtained from primary caries, and it is not, therefore, surprising that their biological development should be dissimilar. In the paper already quoted* we saw that anaerobic conditions modified the characters of the ordinary staphylococcus, and we see from Dr. Choquet's results that the organisms from under the fillings were slow in their initial development. If we still more closely examine the condition under which these organisms below fillings were living, we find another important difference of environment between them and the organisms in primary caries. Presuming the filling to be of average standard, very little fluid from the mouth can find its way to the

*Congress Dermat., *loc. cit.*

under surface of the filling, and as a consequence very little carbohydrate is available for the activity of the organisms that may be there. On the other hand, in primary caries both solid and still more fluid carbohydrate gains easy access to the dentin in which the organisms are living. Now, the fermentation of carbohydrate produces the major part of the acids formed by the activity of organisms in the buccal cavity and elsewhere, so that we should expect from theoretical surmise that the process of dental decay would be more rapid where the supply of carbohydrate was most plentiful, and we undoubtedly find that caries under a filling is as a rule much slower than caries on the surface of a tooth in a mouth in which much carbohydrate *débris* exists.

There is another point that may also be explained from a consideration of these facts,—namely, that Dr. Choquet appears to have found different organisms under his fillings (three in number) from the ones described by myself in primary caries. Three isolated cases are somewhat slender evidence; but supposing that the organisms occurring in primary caries differ from those in secondary caries, the facts pointed out would account for the difference, those organisms best fitted to survive the changed conditions being those that Dr. Choquet has found under the fillings. On the other hand, it may be that the organisms Dr. Choquet has described are members of species already known, but which have had their growth modified by the altered conditions; and as no information is given as to whether the descriptions apply to the organisms when they have developed their “laboratory habit” or when they are first isolated, it is difficult to make any certain statement.

The bacillus No. V has something of the characters of one of the organisms I have already mentioned in connection with caries, but, owing to the description on ordinary laboratory media being omitted, it is impossible to be sure. If Dr. Choquet, in continuing his researches, will give the proper and accepted descriptions, and will at the same time tell us something of the morphology of the organisms on the different media, besides the descriptions on his special media, there will be an opportunity of confirming his work.

In conclusion, I wish to particularly point out that I have never considered dental caries to be due to a specific organism, as I find myself quoted as saying. Nothing is more remote from my thoughts, the process of caries being comparable to putrefaction, in which phenomenon several organisms are concerned in symbiotic activity.

OFFICE STERILIZATION.

BY HENRY W. GILLET, D.M.D.

(Read at the annual convention of the Northeastern Dental Association, Providence, R. I., October 16, 1900.)

THE too common disregard of the essentials of sterilization of instruments by many practitioners still continues to bring discredit upon the dental profession as a whole.

The type of operator so common a few years ago, who held that every instrument should have its place, and who taught and prac-

ticed that each instrument should be immediately returned to that place whenever used, to the end that there should be no accumulation of instruments upon the operating table, and consequently no lost time in finding any particular instrument and no delay in changing patients, has fortunately become rare.

Still his successor, who is content if the outward traces of their last use are removed from those instruments readily accessible to inspection by his patients, and who transfers such appliances as clamps and matrices from mouth to mouth with no precautions whatever, is common enough in our ranks.

This paper has been written with several objects in view. First, with the hope of stimulating interest on the part of some who still fail to take such precautions in these lines as are deemed essential by those competent to speak with authority on the subject. Second, with the hope of raising discussion and bringing out reports of different precedures on your part, which shall prove helpful to those grappling with the very considerable difficulties of complete sterilization of dental instruments and tend to define just what may be considered the most acceptable, most simple, and most effective process for attaining that end. Third, with the hope of contributing one or two points of value to so important a problem.

As indicated by my title, it is not my intent to deal so particularly with the individual instrument, but more especially with the operating room as a whole, and with the operating cabinet, and to call attention to the fact that in ordinary practice, as it is to-day carried on in our ranks, we leave something undone even after we have sterilized with all possible care the instruments themselves.

In this, however, we are not dropping so much below the standard set by other specialists and general practitioners. There are several reasons why it is more difficult to deal with dental instruments according to the present accepted standards for sterilization than it is with most other surgical instruments.

Some of these difficulties are essentially connected with the work they are to do, and must be met; others, in the estimation of the writer, will disappear as the demand for needful changes become sufficiently widespread to influence the pockets of the manufacturers. The serrations and grooves of burs, files, pluggers, and canal cleansers are essential, but the knurls and file-cut effects of the steel handles can be abolished with advantage for all concerned, and their disappearance will mark another step in harmony with scientific progress. Whether the wood and rubber handles so attractive to many of us can be equally well dispensed with is less certain, but they certainly do add to the difficulties of satisfactory sterilization by the boiling process at present accepted as certainly efficient. The number of instruments used by the average practitioner in an appointment of two or even one hour's duration is an item of considerable importance in relation to their effective cleansing, and any systematizing of forms and shapes so as to reduce the essential number without undesirably curtailing the exercise of individual choice in their selection will be welcome in this connection.

Dr. Wm. H. Potter,* to whom we are indebted for some of the earliest and most effective published work from among our ranks relative to instrument sterilization, seems to have come close to the ideal in this respect, but he has also eliminated another and, in my opinion, exceedingly important detrimental influence.

His abolishment of the dental cabinet and substitution of metal racks and clean towels spread on a table, keeping all sterilized instruments so separated as to prevent contamination of adjoining instruments when selecting the desired one, is ideal in its results, but is so radical a departure from the methods of procedure which have become an essential part of our daily work that I have never been able to bring myself to imitate him, and I have not seen evidence that others are doing it.

It was my consideration of the need for eliminating the dangers lurking in the ordinary dental cabinet that led me to the practice which I will describe to you later, and which seems to me to have a possible value to us if the details are worked out to a point reducing some of the present inconveniences. It must be admitted that, strive as we may to sterilize each and every instrument after use,—use every resource at our command, clean them mechanically, dip in ninety-five per cent. carbolic or strong formalin solution, employ the formalin or the steam sterilizer,—and then place the instruments in the ordinary dental cabinet among other instruments, and their surgical cleanliness at once becomes a matter of conjecture; indeed, it becomes reasonably certain that a large proportion of the instruments so treated are not surgically clean when they reach the next patient.

When, if ever, were the instrument drawers of your cabinet surgically clean? Has it been scattered time and again with particles of decaying tissue? are its cracks, crevices, and its plush linings (if you still retain them) loaded with bacteria and spores which may have come from mouths of patients with any or all of the diseases to which flesh is heir? Has the brushing and wiping you gave it yesterday, last week, or the week before done more than make it *look* tidy? Are you sure that you did not touch the instruments on each side of them in picking out your scalers or burs yesterday when at work for that patient whose physical condition led you to take extra precautions with the instruments you used?

When formaldehyd gas first came to my attention as a sterilizer I set about making inquiries as to its fitness for our uses; and while the data then accessible were not sufficient to lead to unanimous conclusions as to its efficiency as a germicide, there was sufficient unanimity in the published reports and among those observers whose opinions I valued and was able to ascertain to lead me to adopt it for certain uses.

Later the results published by Mr. Horton,† of the University of

**International Dental Journal*, December, 1894, p. 745: "Some Details as to the Care of Dental Instruments."

†*DENTAL COSMOS*, July, 1898, p. 543: "Formaldehyd as a Practical Disinfectant for Instruments."

Pennsylvania, with the co-operation of Dr. Kirk, and by Dr. F. W. Low,* gave us some reliable data applicable to the conditions with which we have to deal practically. It is not my intent to quote at any length from either of the papers mentioned, since they are so recent and so accessible that they must be familiar to most of you. I wish, however, to review so much of them as will serve to recall to you the conclusions and the circumstances under which they were reached.

You will remember that in Mr. Horton's work the sterile instruments were first infected with known cultures or from selected cases from the clinic room, then dried to increase the resistant capacity of the bacteria; and after reserving a portion for controls, the rest were exposed in a tightly-closed chamber to formaldehyd gas, in the proportion supplied by five grains of paraform to a little less than one cubic foot of space for fifteen minutes and for ten minutes. Numerous repetitions of these experiments resulted in the conclusion that fifteen minutes' exposure under these conditions was sufficient to sterilize dental instruments. As a matter of fact, it would seem from the report that ten minutes' exposure was practically sufficient. The standing of the gentlemen making this investigation is sufficient guarantee of the value of the conclusion reached.

The work of Dr. Low seems to have been equally carefully performed, the bacteriological work having been in the hands of an investigator of good standing; and the description of the inoculation of the culture-media indicates that all conditions essential to the gathering of reliable data were observed. Many of Dr. Low's reported tests were avowedly for the purpose of demonstrating the efficiency of a certain lamp which he does not describe, and merely duplicate the reported tests of other observers as to the efficiency of formaldehyd gas in a closed chamber when used in proper proportion; but he also demonstrated its efficiency when used under other conditions. In other words, he made plain the fact that concentration of the gas, and not its mere passage over the objects to be sterilized, was essential to effective action. He also reported a series of tests which apparently demonstrate beyond cavil just what we would expect,—namely, that the ordinary instrument case will practically always contaminate any surgically clean instrument placed in it.

Before these two reports had been published, the conclusions of Dr. Chas. Harrington† had led me to provide means for attacking the festive germ in his lurking-place. Dr. Harrington in his conclusion begins with this statement: "Formaldehyd has extraordinary power as a surface disinfectant,—greater than any other known substance." His experiments were made in large rooms and also in cabinets, and he demonstrated conclusively that all bacterial life which we would have reason to fear in our professional labors could be destroyed in large rooms by filling those

**Ibid.*, February, 1900, p. 133: "Uses and Limitations of Formaldehyd in Dentistry."

†"The Possibilities and Limitations of Formaldehyd as a Disinfectant." *Amer. Journ. Med. Sciences*, January, 1898.

rooms for a few hours with formaldehyd gas in suitable concentration.

This seemed to me to be of sufficient importance to warrant action upon the part of those having surgical work of any kind to do, and, indeed, it would seem to me that the waiting-rooms of hospitals and of general practitioners having considerable office practice might well come within the field of action.

I proceeded to provide my operating room with means for closing tightly all openings to the outer air and to adjoining rooms, so that I could in five minutes or so close it up and start the generation of formaldehyd gas, leaving it for the night. Ordinary weather-strips prove efficient for this purpose for the doors. A window was provided with a suitable lock so it could be opened from the outside in the morning and the airing-out process started. This works very satisfactorily, so far as it goes, but is not free from objections. It is rather expensive for daily use, even in a small room, and it does not in any way influence the conditions in going from patient to patient during the day. It does insure a sterile room for the first case after the office is opened in the morning. Of course it is understood that all drawers and closets are opened before starting the sterilizer, so as to give ready access for the gas to all desired quarters.

Dr. Low seems to have been working along the line of sterilizing the ordinary cabinet by means of a generator placed inside it. He did not, however, make plain just what his procedure was, or mention any means of insuring access for the gas to the different parts of the cabinet, or for preventing the escape of the gas generated into the surrounding air.

I have recently had made a frame covered with thin rubber cloth, large enough to inclose my whole instrument cabinet with its drawers open. This serves well for sterilization of the cabinet and contents at a much lessened expense, and the sterilization of the whole room is reserved for special occasions when strictly surgical work is pending or it is felt that the accumulation of possible bad conditions demand it. It still fails, however, to clear up the difficulty attendant upon thorough sterilization of all possibly infected instruments and surroundings, combined with quick succession of one patient by another and the use of the prevailing type of cabinet. The hood or tent is also rather troublesome to place and remove, so that closing the room at night still has its attractions.

More recently still it has occurred to me that many cabinets may be so arranged as to be easily closed up tightly, and I am planning a more workable modification of my hood which shall attain the same end.

If I were at this moment ready to build that model operating room that we all have in our castle in Spain, it seems to me I should build it in duplicate with cabinets that could be closed tightly and quickly by doors or roll curtains of some kind, and that one cabinet and its contents would be sterilized while the other was in use. Possibly the duplication of the cabinets and instruments, and so mounting the cabinets that one could be readily rolled back

and replaced by the other would be the simpler plan. Either plan means increased expense both for outfit and for intelligent office assistance, and I will be glad to learn of any other and simpler procedure that will attain the desired end.

SOME CONSIDERATIONS RELATIVE TO THE MANAGEMENT OF THE INFANT MOUTH.

BY EDWARD C. KIRK, D.D.S., PHILADELPHIA, PA.

(Read at the annual convention of the Northeastern Dental Association, Providence, R. I., October 16, 1900.)

THAT proper care of the mouths of children is one of the necessary conditions to securing sound dentures is a proposition which is accorded general recognition not only among dentists and medical men, but to a large degree it is a matter of common knowledge among the laity. Much attention is given to the subject both in the ordinary course of dental practice and in our literature. We all understand that the child should be early taught the use of the tooth-brush, be trained in habits of oral cleanliness; taken at an early age to the dentist for prophylactic or restorative treatment; in fact, be given the practical benefit of our acquired wisdom so far as it may help to preserve in a state of structural and functional soundness his deciduous dental organs, and a continuance of the same conditions with their permanent successors.

We have gone even farther than that, for not a little attention has been given to those prenatal nutritional conditions which we believe influence for good or ill the developing tooth-germs; and it has been suggested, with some basis of reason, that the nutrition of the mother might possibly be controlled through a specially selected food supply to a degree that would influence the structural character of the developing dental organs during the period of prenatal existence.

While we have given much consideration to these two stages of tooth evolution,—viz, the prenatal stage and the period of functional existence following their eruption,—there is a period in the life of the infant to which but little attention is given in so far as it relates to dental development and oral health, and which may indirectly exert a most important bearing upon the future well-being of the dental organs. The period to which I refer is that from the birth of the infant until eruption of the teeth. It is evident at the outset that as the teeth during the period referred to are still within the crypts of the alveolar border of the jaws and not subject to the vicissitudes of an infected environment,—as they are, for all practical purposes, not situated within the oral cavity, and hence not subjected to the dangers of caries,—any influence which may affect their structure must be brought to bear through the general nutritive processes of the infant system, by general rather than by local causes.

At birth the deciduous teeth have calcified only to an imperfect degree, and none of them to the entire extent of the tooth-crown.

The process of tooth-formation is still going on, and with relatively increased activity, and any interference with the process at this period is indelibly recorded in faulty structure, of which we find frequent examples in pits, ridges, or depressions in the enamel surface after eruption of the tooth is complete. Syphilitic infection, whooping-cough, the inflammatory diseases of childhood, the exanthemata, and malnutrition frequently leave traces of their disturbing effect upon the general nutrition during this period of infancy in the structural defects already referred to, and which are familiar to all of you. These instances are merely cited as well-known examples of some of the active causes of imperfect dental organs in order to direct your attention to the manner in which faulty tooth-structure is produced by acute disturbances of bodily nutrition during the period of tooth-formation.

There is, however, a much more common source of nutritional disturbance in the infant, which, because of its relatively trivial character, has apparently not been studied with reference to its bearing upon the health status of the infant mouth and teeth,—certainly not to the extent that its importance in this regard would seem to warrant. The disturbance to which I refer is commonly called colic, a disorder which is popularly regarded as one of the necessary concomitants of infancy, to be lived through and borne by the victim as one of the experiences of early life from which there is no hope of escape.

It must be evident that the fermentative dyspepsia of which colic is the most evident symptom is a fault in the digestive process, which if long continued cannot fail to be the fruitful cause of nutritional disturbances having important bearings upon the health status, and consequently upon the development of the whole organism at this highly sensitive and impressional period of its career. Every one who has had to do with the cultivation of plants or the rearing of animals knows by practical experience that an interference with the nutritional conditions of a growing plant or animal, even for a short period, tends to bring about an arrest of development of the organism, which is profound or prolonged in direct ratio to the magnitude and extent of the interference. The growing organism seldom if ever fully recovers from a shock of that character, and never reaches the same perfection of growth that is attained by an organism which has not been subjected to an interruption of its nutritional process. Hence, upon general principles, a fermentative dyspepsia in infancy is not a thing to be regarded as of slight consequence to the health status of the child, but as something to be avoided or promptly treated in order that its inalienable right to the best attainable physical endowment may be secured to it.

Let me, with a view to that end, direct your attention to some of the means which experience has shown to be valuable in this connection, and which seem to me to have a rational basis to recommend them. But first of all we will consider for a moment the factors which commonly bring about these attacks of fermentative dyspepsia in the infant. Careful and somewhat extensive studies

of the mouth of the infant at birth tend to show that upon its entrance into the world the infant oral cavity is germ-free, in which respect it is analogous to freshly-drawn milk or a new-laid egg, each of which have been shown to be sterile of bacteria as they leave the bodies of the respective organisms wherein they are produced. Inspection of the infant mouth at birth would seem to bear out the results of scientific test, for the appearances presented by the oral mucous membrane are characteristic and striking. The tissues of the oral cavity are free from deposits, the texture of the mucosa is indescribably fine and perfect; there is absolutely no visible evidence of the irritative effect of bacterial influence in the shape of congestions or inflammatory reaction,—a page in histological development devoid of pathological impress of any sort.

But this organism is now transferred from an environment in which it may be assumed that no extrinsic sources of irritation interfered with its normal development to an environment everywhere filled with bacterial forms, which invade its oral cavity and, in so far as conditions are favorable, set up irritative processes which in greater or less degree, locally or generally, modify the infant nutrition. A contest for the balance of power has begun between this small human life and the irritative factors of its new environment,—a contest which is continuous throughout life, and in which an unstable equilibrium is maintained with the balance of power oscillating from time to time between the human organism and the irritative forces of its environment, ending finally in the triumph of the latter. Let us study the steps by which one of the earliest of these bacterial invasions results in the especial nutritional disturbance under consideration.

The germ-free condition of the infant oral cavity is one of short duration. Infection probably takes place at the first inspiration of air with the first cry announcing the advent of a new human existence. Germs of fermentation and putrefaction find lodgment upon the mucous lining of the oral cavity, and, finding conditions of temperature and moisture suitable for their growth, simply await the third factor necessary to their activities,—viz, a suitable pabulum as a culture-medium. This is furnished in the natural food supply of the infant. Milk, with its blended carbohydrate and proteid elements, furnishes an ideal pabulum not only for the nourishment and growth of the infant, but for numerous bacterial forms as well, which in utilizing it as food rapidly bring about its decomposition, splitting it up through fermentative and putrefactive processes into simpler organic compounds, many of which are irritating and not a few poisonous.

This cycle of changes is set up in the residuum of milk remaining upon the oral mucosa after the first feeding of the infant. Decomposition of this film begins at once, and a whitish deposit is formed upon the dorsum of the tongue, which is highly infected, and which, if allowed to remain, becomes the connecting link in a chain of circumstances which may ultimately throw out of balance the whole digestive process.

Every housewife knows what happens when fresh milk is put

into an unwashed pan or vessel which has previously contained sour milk. Infection at once takes place, and fermentation of the new milk begins. So much is this observation a matter of common knowledge that the utmost care is of necessity exercised by those who handle milk commercially to sterilize all vessels used in marketing their product so that it may reach the consumer uninfected and not lose its keeping qualities. The same principle is observed generally by those who intelligently apply the results of scientific observation along this line in the artificial feeding of infants. Nurses are now trained to an understanding of the best methods for sterilizing not only the milk itself, but the apparatus used for the artificial feeding of infants; the sole purpose of these precautions being to deliver to the infant stomach a pabulum free from bacteria, which when present in the food supply so alter its composition as to reduce its nutritive value and, what is still more important, set up decomposition processes within the alimentary tract of the infant which are direct causes of irritation and disease to the infant organism.

The infected condition of the infant mouth already referred to is a factor in the causation of gastro-intestinal irritation which is not so generally taken into account as it should be. While the utmost care is exercised with regard to the sterilization of the feeding apparatus and the food itself, the infected oral cavity is frequently left to take care of itself until manifestations of local irritation direct attention to the need for relief. Why this link in the chain should have received so little attention is difficult to say, yet the failure to eliminate it as one of the causal factors in the production of gastro-intestinal irritation is as fatal to success as would be to deliver food to the infant stomach from an infected nursing-bottle or a dirty milk-vessel. Sterilized milk passed over an infected mucous membrane with its coating of fermenting and putrefying residue of the previous meal is delivered to the infant stomach in an infected condition, just as it would be if passed through an infected nursing-tube.

There can be but one result: Fermentation of the infected fluid begins in the stomach; putrefaction of the proteid elements may take place; quantities of gas are formed, distending the walls of the stomach and intestines, causing pain and irritation, further increased by the irritating effects of the organic acids which are end-products of this fermentative process. Digestion is interfered with or arrested, the fermenting mass of food becomes a mechanical as well as toxic irritant; diarrhea sets in; the whole nutritional process is interfered with, and development is damaged in proportion to the length and severity of the attack.

The rational remedy for this state of affairs is clear when once we understand the conditions to be therapeutically met: In the first place, removal of the primal cause by thorough oral cleanliness and sterilization in so far as that end may be attainable. This may be practically accomplished by wiping the mucous membrane with a saturated solution of boric acid to which borax has been added in the proportion of ten grains to the ounce, or with a very dilute solu-

tion of phénol sodique, one-half dram to the ounce, applied on a cotton swab or with a soft linen handkerchief wrapped around the finger of the nurse. The cleansing of the oral cavity in this manner should be part of the daily infant toilet, or repeated oftener if occasion should demand it.

For the treatment of the existing gastro-intestinal irritation the use of opiates and sedatives is irrational and worse than useless. The indications are to remove the sources of chemical irritation by neutralizing the acidity, and the mechanical irritation of the undigested food-mass by a mild laxative. These ends accomplished, the *vis vitæ* of the infant organism is strong enough to rapidly restore the digestive processes to their normal state.

I would direct your attention to the peculiar adaptability of magnesium hydrate to the treatment of the conditions which I have endeavored to describe. It promptly neutralizes the acids of fermentation, forming organic salts of magnesium, which possess mild laxative properties, so that the preparation accomplishes a double purpose by removing both chemically and physiologically the two classes of irritants concerned in the disease process under consideration.

It has fallen to my lot to treat a considerable number of case of gastro-intestinal irritation in infants which have unfailingly responded to treatment carried out as here indicated.

There is one other fruitful source of infection of the infant food supply to which I would call your attention,—namely, in the case of breast-fed infants, the breast of the mother. In the early stages of lactation the activity of the mammary gland is frequently such as to exceed in productiveness the needs of the newborn infant, a state of affairs which may and often does continue for a considerable period of time. As a result of this lack of harmony between supply and demand the overcharged mammary gland overflows from time to time, and small quantities of milk are discharged upon its surface. This film is at once infected from the clothing or cuticle, and becomes an active source of infection to the infant alimentary tract unless the precaution be taken by the mother to thoroughly cleanse the nipple and breast previous to nursing the infant. The same necessity for sterilizing the feeding apparatus exists whether the process of feeding be artificial or natural.

I have deemed it to be worth while for us intelligently and carefully to consider this question, for the reason, first, that I believe it to have a direct bearing upon oral health and consequently upon the question of normal development of the dental organs, both as to structure and position. Second, because of its bearing upon the vital status of the infant at that period of tooth-development and evolution which precedes the eruption of the dental organs, I believe it to be one of the important factors in pathological dentition; and, finally, as it is a problem distinctly within the limits of our specialty and one upon which we are expected to give intelligent judgment, it is our duty to meet the expectations and needs of our *clientèle* in that department as in all others.

NUTRITION AS A TOOTH-BUILDER.

BY MR. H. D. PERKY,

PRESIDENT OF THE OREAD INSTITUTE, OF WORCESTER, MASS.

(Read at the annual convention of the Northeastern Dental Association, Providence, R. I.,
October 16, 1900.)

MR. PRESIDENT AND GENTLEMEN OF THE NORTHEASTERN DENTAL ASSOCIATION: The invitation to speak to you on this occasion was the more deeply appreciated and the more readily accepted because I am not a member of your profession, and could not therefore be expected to reveal to you heretofore unknown truths in the realm of dental science or to advocate the adoption or rejection of proposed methods in what may be called practical dentistry. Rather did I recognize in your invitation that spirit that seeks the welfare of humanity in immunity from the punishment that inevitably awaits the transgressor of natural law.

Mankind appreciates to-day as never before the worth and possibilities of dentistry; and particularly is this true as regards our own country, which, were it not for the skill, ingenuity, and achievement of the American dentist, would be inhabited by an almost toothless race. The skill of the dentist has saved the lives of many and prolonged the days of countless others, for by his work in no inconsiderable degree has he safeguarded health.

Life is sustained by food, and the measure of good health is determined primarily by the nature of this food. It must contain the principles, without one jot of abatement, from which the body is built, sustained, and renewed from day to day. However, food to fulfill the purpose designed by nature must undergo various processes in consumption, and the first of these is its preparation by the vigorous use of the teeth. It is upon the importance of this preparation of food and its relation to life and health that I come, as a student of foods, their selection, preparation, and utilization, to speak to you, whose life calling is the science of dentistry, upon the theme "Nutrition as a Tooth-Builder."

One of the first of the lessons taught the student in theoretical dentistry is that the teeth in their anatomy are not, as people in general suppose, a part of the skeleton, but are attached to it. Though similar in their composition to the bones of the body, they are subject under certain conditions to decay and total destruction, without, however, maiming the body in the sense that the loss of an arm, leg, or even a finger would entail. In their anatomical organization the teeth consist in the main of dentin, enamel, and cementum. Two other substances, called respectively osteo-dentin and vaso-dentin, are sometimes found in human teeth, though always in abnormalities, if I correctly understand the professional text-books. Then there is the pulp of every tooth, that is alive and active. This pulp is the delicate yet powerful mechanism that aids in compounding and preparing the constituents for the formation of dentin and its mass of fibers. The pulp is the very heart of the tooth, the engine, so to speak, that immediately supplies means of activity without impairment by continued use of the teeth. The nerves and bloodvessels of the tooth are contained in the pulp, and, like every

other organism of the body, it is discriminating in its action, selecting with an infallible accuracy, when opportunity is offered, just those particles from the food substances that are correct in kind, degree, and proportion to construct and sustain the normal teeth.

Briefly, it may be said that the teeth are, in their construction, of a calcified nature. The calcification or formation of the teeth is simply the conversion or secretion of the mineral substances contained in food into dentin or dentinal fibers. Teeth have one or more roots, according to their class, and these roots are set and fastened in sockets, the technical designation of which is the alveolus. Through a hole at the root of the tooth there is direct connection between the pulp-cavity of the tooth and the other organisms of the body, forming, as it were, a route of intercommunication.

It is an accepted teaching of anatomy that the teeth are a portion of the digestive organs, and it is distinctly apparent that the process of digestion set in operation by the teeth should be in the highest degree correctly performed, that the next succeeding work may not be hindered or imperfectly consummated. When the mouth closes upon a portion of solid food it is the appropriate province of the teeth to bite and chew, to masticate finely and thoroughly; and as this mastication proceeds the salivary glands are set in motion, resulting in a deglutition of the mass, and the food enters the stomach, other conditions being normal, suitable for its further disposition. When mastication has been properly done there is harmony of action between the digestive organs. Improper mastication throws all the digestive machinery out of order; an initial law of nature has been violated, and the friction of error is manifest early in the process of digestion.

I am well aware that what I have said regarding the anatomy of the teeth is thoroughly familiar to the members of this association, yet the desire to present my conclusions so as to be understood is the reason for this brief reference to this feature of the subject.

Nature's provisions are such that man throughout life may have complete sets of teeth. I do not wish to be understood by this that old age does not bring in its general decline of physical forces a devitalization of the teeth. What I do assert is that it is natural for the teeth to last as long in their vital force as the bones of the body. The durability of the teeth after death is shown by simply countless instances to be equally as great as that of other portions of the skeleton,—in fact, greater. The skulls of Egyptian mummies, of perhaps the age of the Pharaohs, are one and all quite certain to show full sets of teeth. Is this due to dentistry? Somewhere I have read that the ancient Egyptians, along with their other accomplishments, understood dentistry. I am inclined to question the correctness of the statement, at least their understanding dentistry to the extent that the science is known in our country at the present. I have yet to hear of the finding of an artificial set of teeth in the skull of an Egyptian mummy.

Another striking illustration of the durability of the teeth in life and after death is that furnished by the skulls of the prehistoric American mound-builders. Exhumations of hundreds, and prob-

ably thousands, of skeletons have been made from the mounds of Ohio and other middle western states, and almost without exception there are found complete, or relatively complete, sets of teeth. At exactly what period of time these mound-builders lived is unknown. Their history is shrouded in deep mystery. We know simply that they are prehistoric; that when De Soto and De La Salle made their early journeys into the interior of what is now the United States the mound-builders had long become extinct. Modern American ethnological science has, however, brought to the light of day the skulls of many of these ancients that we might have the opportunity of study and comparison which would enable us to draw conclusions concerning the way these ancients lived and the foods they ate, as revealed by an inspection of their skulls.

In the Peabody Museum of American Archæology and Ethnology, which forms a part of Harvard University, is a large and valuable collection of the remains of this extinct race. In the same museum are also to be seen the skulls of men who died in the remote past, exhumed from mounds and cemeteries in Tennessee. Like those of the mound-builders in Ohio, these skulls contain sets of teeth that are remarkable for completeness and soundness even after the great lapse of time since their consignment to the earth.

But perhaps some of the most notable instances of the durability of the teeth which I have the privilege of presenting to you is that of prehistoric men who are supposed to have lived and died in Peru in the eighth and ninth centuries. The collection of these skeletons to which I call your attention is also found in the Peabody Museum at Harvard University. Now, history teaches that centuries before their conquest by the Spaniards there existed in Peru and Mexico a magnificent civilization. That the Peruvians possessed a knowledge of many arts and sciences that only a high degree of civilization could inspire and develop we know by the remains of their works, the ruins of which are yet to be seen. They knew of a way of embalming the dead that was as truly marvelous as that so extensively and successfully employed by the Egyptians, and because of the employment of this art and knowledge modern American archæological research among the dry bones of the Andes has brought to our sight the skeletons of these men who trod the earth, breathed the air, drank the water, and ate the foods of South America possibly twelve centuries ago. In a sense the physical remains of these remote Peruvians are more than mere skeletons, for in each individual instance the flesh still adheres to the bones, though dried to a crisp. Upon some there yet remains the hair of the head, still retaining its probable natural hue. But what relates more particularly to our subject is the fact that scarcely without exception each skull presents complete sets of teeth. In only one or two instances is a tooth gone, and that has been by the breaking away of that portion of the bony socket in which it rested. Taking the Peruvian collection of skeletons as a whole, the teeth may be called perfect so far as their formation goes. The teeth are regular, symmetrical, and, of course, had they not been free from caries they would not have endured all these centuries. In the depart-

ment of comparative anatomy in the building of the Boston Natural History Society are also to be seen the skulls of ancient and prehistoric Peruvians, and in these are complete and wonderfully well-constructed teeth.

Here is to be found the skull of an Egyptian mummy showing evidence of great age, yet the teeth are all present and perfect in this skull in spite of the thousands of years that have passed since it was endowed with life.

Here also is to be seen the skull of an Ashantee negro with every tooth intact, sound and fully developed, which it seems fair to presume is representative of the race of the west coast of Africa.

Still continuing the tour of the Boston Natural History Society's rooms, a skeleton of a Hottentot, the "yellow fellow" of South Africa, is found. The conditions under which the Hottentot existed when in life were materially different from those of the Ashantee negro. The climates of the two countries differ, and so do the foods, at least to an appreciable extent; yet with the Hottentot skeleton, as with that of the Ashantee negro, every tooth is present in the skull, and in the case of the Hottentot the teeth are notably perfect, regular, and sound.

From South Africa to the island of Hawaii is a long distance, but I propose in this consideration of my topic to present information from as many points of the world as practicable, and therefore make my conclusions as credible and valuable as circumstances will admit. To this end my next illustration is that of a skeleton of an Hawaiian woman. How long ago she lived there are no means of knowing, but there is some evidence of a considerable age of the skeleton; and, as it shows a full quota of teeth which are as white as ivory, I conclude that the skeleton is not that of a modern date Hawaiian, as there are indications that the Hawaiians of today have teeth which lead to the suspicion that they are becoming Americanized in more ways than one.

In the Natural History Society's building are numerous skulls of American Indians. The teeth in these are almost without exception remarkable alike for completeness, beauty of form, and symmetry, and present evidences of general excellence. Indeed, of all the teeth I have observed in a wide range of races, civilized and uncivilized, there are none that surpass those of the aborigines of North America. In the Museum of Comparative Zoology of Harvard University is to be seen a complete skeleton of a Sioux Indian. The teeth are such as will please the eye of the dentist, so perfect is their formation. Some may say that a single one or a score of instances do not establish the fact that the teeth of all Indians are good. While admitting the reasonableness of this view of the case, permit me to suggest that probably no one has ever seen decayed teeth in a full-blooded American Indian, provided he lived after the manner of the race and free from the ways of the white man. Under the laws of nature such a thing as defective teeth in an American Indian, living as he did before the advent of the white man, would be out of the question, or, at most, an exception, for, unhandicapped by man, nature is infallible in working out results.

As I understand the history of all uncivilized races existing under purely aboriginal conditions, they had maintained properly developed teeth.

Turning from the human to the brute creation for a further exemplification of our proposition as to the durability of the teeth, we find in both wild and domesticated animals evidence practically inexhaustible that when the teeth are built and sustained in accordance with the laws of nature they are as permanent, as free from defection, and capable of as great duration as any bone in their structure. In the building of the Boston Natural History Society and in the Museum of Comparative Zoology at Harvard University are vast collections of the skeletons and skulls of wild and domesticated animals of every clime and zone, and of the fishes of every sea. The teeth in all these give no more indication of decomposition than any other bone in the skeletons.

Having presented to you illustrations of the durability of teeth of varied races, I next invite your attention to a consideration of the materials from which they are built, the sources from whence these materials come, and the laws making possible their utilization in the building, maintaining, and preservation of these important factors and initial source in, to our understanding, the somewhat complicated system of digestion.

Consulting the text-books we learn that the teeth are calcified organs; that the dentin which forms the bulk of the crown and root of a tooth is composed of about three-fourths mineral or earthy matter to one-fourth animal matter; that the enamel of the crown, which, by the way, is the hardest part of a tooth and the hardest substance of the body, provided its formation is natural, contains almost ninety-seven per cent. of mineral salts and only a little above three per cent. of animal matter. This mineral matter that constitutes so large a proportion of the teeth is the salts of lime, or, in other words, phosphate of lime.

We have already spoken of the anatomical relation of the teeth to the other organisms of the body, and of the pulp and its cavity in the interior of the tooth, from which is secreted the dentin, the enamel, and the cementum, which forms the surface of the root of the tooth. In anatomy it is the nerve and bloodvessels of the tooth, and is connected with the other organisms of the body by a delicate tissue passing through the root lengthwise. In plain English, the pulp of the tooth may be styled a distributing reservoir, its special purpose being the supplying of dentin, enamel, and other portions of the tooth with their mineral and animal substances. Now, the existence of a distributing reservoir presupposes a main source of supply, with direct communication between the two. Through the channel uniting the main and distributing reservoirs only the matter desired is expected to pass. Care is taken to prevent the entrance into this channel of all foreign substances, to the end that the distributive basin may serve to the fullest possible extent its purpose. In nature the laws governing supply and demand are fixed and absolute. When the supply of the salts of lime and other substances ceases, then the pulp ceases the work of

tooth-building. The stream runs dry. The teeth, no longer fed, become devitalized. The process of decay ensues, and continues until the loss is entire. They simply die. The primary cause of this decay and loss of the teeth, with attendant misery, suffering, and loss of health, is nothing less than starvation of the teeth. They died because they had not sufficient nourishment, even though the stomach of the body of which they were a part was gorged with food. It mattered not so long as this food did not contain the particular nutritive substances the teeth required, for in nature there are no compromises, no substitutes.

Whence do the teeth seek their source of lime and other substances? In the food we eat and by proper digestion make possible of appropriation. The philosophy of living as regards the sustenance of the body is eating, under proper conditions as to environment, etc., a sufficiency of such foods as contain those nutritive constituents essential to the nourishment of every organ and portion of the body. This declaration I have simplified by the statement that "naturally organized foods make possible natural conditions," to which I add, and am justified in adding, the phrase "and there is no other way." This is my platform in my crusade of education for proper living by proper foods. The beauty and strength of all nature is simplicity, and in no other phase of nature is this simplicity more manifest or more plainly to be observed and understood than in the lesson I have for years labored to spread throughout the land, that "naturally organized foods make possible natural conditions, and there is no other way."

All foods as they come from the laboratory of nature are naturally organized, yet it is not to be understood by this that each in itself contains all the nutritive properties in correct proportions for the complete nourishment of the body. There must be a combination and a variety of properties in food to answer the purposes of perfect physical nourishment. However, this much can be said: that in the grains, like wheat, Indian corn, rice, rye, barley, and oats, there is a decided approximation toward a complete food. Wheat is shown by analysis, and by the experiences of the various civilizations of the world, to stand at the head of all grains available for a universal food in its nutritive value. The nutritive values of Indian corn and rye are also extremely high in a comparative sense. Wheat was an important part of the food of the Egyptians long before the time of Moses. The people inhabiting the earth from the earliest times of which we have knowledge, and until comparatively recent times, were frugivorous and herbivorous; they lived upon fruit and vegetables. From remotest times Egypt has been a land of fruit, grains, and vegetables, and the annual inundations of the Nile have served to maintain the land in the highest state of fertility. The Egyptians whose mummies are found in so many of the museums and natural history rooms throughout America and Europe had full sets of sound and fully developed teeth. This we know, for they are to be seen, and that, too, in bodies from which life departed two, three, and even five thousand years before the dawn of the Christian era. Those Egyptians lived upon naturally

organized foods, that made possible natural conditions. Wheat and barley, grapes, figs and pomegranates, cucumbers and melons, onions, leeks, and garlic. These last three, you will remember, the Israelites murmured for as Moses was piloting them through the wilderness from Egypt into the land of promise. I said that the annual inundation of the Nile maintained the fields of its valley in the highest state of fertility. And what do we mean by fertility of the soil? Simply an abundance of proper food, to the end that it might give up abundant harvests, and thus fully respond for the purposes intended in the unerring economy of nature. Nature asserts, with a positiveness that man takes heed of in the matter of plant life, no matter what its kind, that it shall not and cannot attain its perfection unless the soil in which it is planted contains a requisite supply of all the ingredients natural, and therefore necessary, to it. Nature fertilizes the Nile valley, but the soil of New England, and all other countries except where there is yet to be found a virgin soil, needs man's aid to supply plant food. These ingredients taken up and organized by plant life serve in turn as food for man and beast. The intelligent agriculturist recognizes the wisdom of feeding the land proper food in proper amount, that the plant growth may be proper food for his domestic animals.

I say "domestic animals," for, while we are careful to supply our fields with fertilizers containing the manufacturer's and dealer's guaranteed percentages of potash, phosphoric acid, and nitrogen, and for our horses and cattle like assured requisite amounts of protein, fat, cellulose, and free extract matter in foodstuffs, we give too little thought to the composition of the foods for ourselves and families. While the national and state governments are expending millions of dollars annually to learn how best to feed the land and to acquire exact knowledge as to what constitutes a balanced ration for a cow, horse, pig, or hen, comparatively little is expended by national or state government, at least in a direct and practical way, to learn what is a properly balanced food for man. For the year 1899 the national government gave to the state of Massachusetts the sum of fifteen thousand dollars for the use of its Hatch experiment station. In addition the state itself gave, directly or indirectly, the sum of more than eighteen thousand dollars for the agricultural experiment station of the little state of Massachusetts. This is wholly in addition to the sums granted the state agricultural college proper. The national government gives to each state experiment station also a considerable sum for the same purpose. As I have said, the great effort of the agricultural college and the experiment station is to teach the farmer the use of proper food necessary to produce the desired plant growth. The state of Massachusetts has laws requiring that all cattle foods offered for sale in the state shall be sold under a guaranteed analysis of their feeding value, and its experiment station has employes whose work it is to go up and down the state to see that these cattle foods contain the percentages claimed by their makers. Were a cattle food placed on the market in Massachusetts so deficient in phosphates as is commercial white flour it would probably have no sale, or, if any

sale, it would be at a ridiculously low price; then I assume that no intelligent farmer would feed it to his cattle before inquiring at the experiment station as to the best means of making up the deficiency which had come about by the disorganizing and eliminating work of man.

Right here we might as well speak of a common error, and one fraught with more damage to humanity than words will ever be found adequate to express. The thought that you can make up for a deficiency resulting from a separation of naturally allied food properties which were organized in the process of growth by supplying properties which are also part of other similarly separated properties is a belief which has no better or other support than is expressed in an ever-changing science emanating from the chemical laboratory of man, which not infrequently is opposed to the chemistry of nature.

Do not by any means understand me as decrying agricultural education in this country. On the contrary, I believe in it thoroughly. But why should we as a people be so quick to accept the law that we cannot get something from nothing as it applies to the feeding of land and animals and ignore the same when it comes to the feeding of ourselves and families? Have we as a people become so engrossed in wealth-hunting or a purely sordid commercialism that we can see the way to wealth through health for our lands and cattle only, and not for and through the proper care of our children?

We can read the lesson every day of what transpires in nature through lack of proper food in the soil to produce the tree, plant, or grain. In fields side by side we see the tree or plant life in one rugged and luxuriant, while in the other there is a spindling, weakened growth subject to attacks of insects and disease. There is a faded sickly color where there should be the deep green that indicates life and vigor. In the first instance the plant life is finding in the soil the principles—that is, plant food—from which it is nourished in every part. In the second field these ingredients are lacking, and its counterpart is found in the degeneracy of that once sturdy, rugged mankind of early New England.

But to return to the ancient Egyptians. I said that I did not believe they understood dentistry as you know it to-day. As they lived upon naturally organized foods, they had sound teeth. What need had they for dentists?

The uncivilized man in all climes lives on naturally organized foods, and such as necessitate the vigorous use of teeth before passing food along in the process of digestion. The fine white teeth of the native African have long since become proverbial. Their whiteness is of a degree that would cause envy in the belle of the present-day civilization. So also was it as respects the teeth of the American Indian that lived in his native element. His foods contained all the life-giving principles stored therein by nature, and when the Indian ate his corn from the ear or coarsely ground in some rude mortar he was forced to chew it well before swallowing. The American Indian has been for centuries a product, in the main,

of the corn indigenous to America. The nuts and fruits and game he ate in addition were all as nature planned and organized them.

The Scriptures tell us that when Moses, in the exodus from Egypt, died on the threshold of the promised land, "his eye was not dimmed nor his natural force abated." The Mosaic laws of diet and sanitation given to the Israelites are still in force among the Hebraic races, and statistics show that the Jews are the longest-lived civilized people in the world. I have no data to prove that the Old Testament Israelites had good teeth, but President G. Stanley Hall, of Clark University, assures me that the exhumations of all ancient peoples show that all had perfect teeth. History teaches that in centuries preceding the present, mankind lived upon naturally organized food, and therefore they had sound teeth.

In the brute creation of past and present, domesticated or untamed, it is rarely that an instance of an unsound tooth is found. There may be abnormalities of birth or diseases the result of accident, but the well-nigh universal rule is normal teeth, sound and regular. Dr. George P. Penniman, of Worcester, one of the most successful veterinarians in Massachusetts, and likewise known to the profession throughout the country, tells me that freedom from caries and other diseases of the teeth in domestic animals is simply wonderful in its degree; but only wonderful, of course, as you compare the teeth of the brute with the teeth of the man that has dominion over him, but seemingly not over himself. Dr. W. L. Curtis, of Southbridge, a physician and surgeon of fifty-five years' practice, who has had unusual facilities of noting the characteristics of all kinds of domestic animals as well as men, gives the same kind of testimony as Dr. Penniman, and in like emphatic, positive manner.

In the rooms of the Boston Natural History Society is the skeleton of a horse that died at the age of forty-two years. The teeth are all present, and not one of them shows any impairment of any kind. This horse had to work all of his days after he was broken to harness. For eight years he was a stage horse on an old Boston and Roxbury line. Then for twenty-five years he was a street-car horse on the West End Company's line from Boston to Brookline. After his service on the street car "Old Billy," as he was called, was set to work in the West End Company's stable, and so continued until his death. He did not spend his last days in idleness, but "kept in harness" to the last. His sound teeth, above all things, enabled him to do this. No man or beast can live their natural length of days when once the teeth are unsound.

I have said that naturally organized foods make possible natural conditions, and of course this included good teeth. But what are naturally organized foods? They are such as in the process of growth extracted from the earth and the air and compounded and organized in nature's laboratory the properties and all the properties necessary for a perfect building-material to build the body and all its parts in a normal and therefore perfect form and condition. The attempt of man to improve, as has been the case, on this perfect building-material is largely—in fact, in the main—the cause

of the physical degeneracy of the race, the evidence of which is prominently manifest in poor teeth. Animal life in its wild and untamed state fulfills to the letter the law of nature as regards the foods with which it is sustained. There is a diligent search for a supply, and when once this is secured it is not only as nature formed and perfected it, but there is in its eating that tooth-action which thoroughly prepares the food for the next successive stage in the process of digestion. If there are instances of diseases of the teeth in wild animals, they are exceedingly rare. This must be so, or otherwise there is no truth in nature. The ox, horse, and sheep, not to mention other domestic animals, eat those foods, when not prevented, that require thorough mastication. So in ancient times, at least among the noted peoples of the earth, man subsisted upon naturally organized foods. The Egyptians of the dynasties of the Pharaohs ate the whole kernel of the wheat. So also did the Israelites in the time of Moses and the patriarchs, and this custom of preserving intact the natural organization of the grains when designed for food still obtains in a great degree in all Eastern countries. A score or more of writers on Egypt and the Egyptians have told us that the ancient people of the Nile valley had simply ideal teeth.

The people of the Orient to-day live in the main upon food that necessitates mastication. Two vital purposes are thus accomplished: the necessary teeth-action develops the jaws and the teeth alike; and, second, there is complete nutrition of the teeth from the eating of food that contains all the natural properties, including the necessary lime, that goes to make some seventy-five per cent. of the dentin and ninety-six per cent. of the enamel of the teeth. These properties have been eliminated from the bread of the American that it may be white, and there is as a consequence a silent, insidious, and never-ceasing degeneration of the teeth because there is not sufficient nutrition. Even the partial destruction of the teeth means a partial mastication of the food, and all this means in turn an impairment of the physical forces. Intellectuality must have for its basis physical well-being in order that a full measure of benefit may be enjoyed. If we are a nation of people with impaired teeth, and therefore impaired physical vitality, our intelligence will avail us but little in the hour of necessity. In fact, the intelligence of people who do not know enough to have good teeth may be called in question.

Your presence here to-day as one of the numerous American dental organizations is sufficient evidence that the teeth of the American people require a vast amount of professional attention. How is it with the teeth of other nationalities? That I might the better answer this question I engaged your fellow-member and dentist, Dr. C. Frank Bliven, of Worcester, to personally investigate over a hundred cases among the heterogeneous population of that city. The investigations were chiefly among the poorer classes, and where but little personal attention of the teeth could be expected. Each examination reported bears the attestation of Dr. Bliven. These examinations include Finns, Swedes, Russians,

Armenians, and Syrians. They all state, without qualification, that white-flour bread and pastry are practically unknown in their native countries.

It is quite out of the question in this already too long paper to give you the details of these examinations. Dr. Bliven is present, and perhaps will tell you more fully the conclusions resulting from these examinations. But I may say that the teeth of these people were found superior in all respects to the teeth of the people of our own country. It was, however, the teeth of the Syrians, perfect in form and preservation, that attracted special attention. The report discloses that of twenty-seven Syrians whose teeth were examined, twenty-one, or nearly seventy-five per cent., had first-quality teeth. Thirteen, or nearly fifty per cent., showed no decay, while thirteen out of the twenty-seven were marked either perfect or excellent. It should be stated in this connection that a considerable number of these twenty-seven Syrians were mothers with babies in their arms. You all know what motherhood means as affecting the condition of the teeth of the American women. Dr. Bliven also noted the condition of the teeth of two-score Syrian children without finding evidence of caries except in one instance. The doctor remarked, "This is really marvelous." But was it marvelous? We say, No, but only natural, for these people lived on whole-wheat food,—whole wheat, fruit, and vegetables was and is the diet of these people.

When I discovered to my own satisfaction that a whole-wheat diet contained all the properties more nearly in the correct proportion than any other available food product to build the harmonious physical body, including good teeth,—and not only this, but that such a diet in a remarkably short time would arrest the decay of the teeth,—I was led to make the declaration that "naturally organized food makes possible natural conditions," and later to add that "there is no other way." But when I searched scientific works for proof of this declaration I was amazed not only to find an absence of reference thereto, but a great conflict of opinion as respects the causes of the infirmities of man so far as food contributed to these results. In this conflict of opinion from scientific sources, what comfort could parents find,—parents naturally solicitous for the welfare of their children? They found confusion worse confounded. I knew there must be some way to aid in proving so great a truth, and therefore began the study of the history of the different civilizations of the world to find out at what period in each civilization the people enjoyed the greatest immunity from conditions that beset our nineteenth century civilization,—a civilization that boasts of its educational advantages and progress. This investigation has been most satisfactory, for it has resulted in establishing that the periods when the people were strong and vigorous, when they had strong bones, good teeth, firm muscles, and when the truly great men and truly great women lived, was in the early part of the history of each civilization. Always in these early periods the people lived on a simple diet of naturally organized food. Then they enjoyed the full benefits of the perfect chemistry

of nature. Then, as now, when man became more civilized, so called, and took upon himself the task of improving upon the chemistry of nature by disorganizing nature's perfect handiwork and perfect body-building material, the trouble began, and civilization perished in consequence.

The proposition that man can take a part of the whole of two or more food products, naturally and perfectly organized in nature's laboratory, in the process of growth extracting from the earth and air the properties from which may be built the harmonious human structure, and combine these parts into a food in his laboratory so as to improve upon nature, is the most stupendous error of any age and any civilization. The deorganization of the structural elements in naturally organized food products is the greatest single factor in bringing about the ills of the present day, and is especially evidenced by the teeth of the people of our civilization.

So intimately associated in natural food-products are the properties that build both teeth and nerve-tissue that when one is eliminated the other is sure to follow, and so it is we find people with poor teeth usually nervous.

The intelligent dentist who by his advice directs the mother how to furnish proper food to build proper teeth, at the same time directs her how to build good nerve-tissue, and thus becomes the greatest factor in the development of healthy human structures. The son and daughter have the teeth that their parents gave them the material to build, and they have no other or better natural teeth.

Upon no food-product—perfect in tooth-building material, in fact in all respects—has there been such senseless ravages by man as that perpetrated on the marvelously perfect whole wheat berry. Food made from separated parts of naturally allied properties of the perfect whole, chemically converted and predigested food, either in whole or in part, and adulterated food, is a great crime, now on the increase, perpetrated against unsuspecting and confiding children and weak and suffering humanity generally. If the present methods in the disorganization, adulteration, and manipulation of foods continue with anything like the ratio of increase for the past few years, dentists, however expert they may be, will have difficulty in finding a basis for their mechanical operations. We can only hope for a remedy for the evils resulting from improper food through education. But when all a man is is what he is educated to be, or his education makes possible, what hope is there when our leading educators cannot give a rational answer to the question, "Why do you eat what you do? Why out of the abundant supply of innumerable food-products do you select what you do?" And so we might ply our educators with questions relative to their physical infirmities with no hope of information of practical value. They know, or seem to know, everything but that one fundamental: how to build the body into harmonious conditions; and what an oversight in our educational system which costs the people countless millions of dollars!

I know I am talking to an audience of unusual intelligence, and therefore may venture to make a few suggestions, pointing the way

out of the wilderness of self-inflicted pain and suffering. We must educate. But first our educators must be educated in this fundamental work, for the A, B, C of proper food must be taught along with the A, B, C of our language. I can conceive of no place to begin this work unless, indeed, it be through the medium which always has and always will respond in cases of great emergency. We must, and I am sure we will not in vain, appeal to the mothers,—mothers' clubs and women's clubs,—aided by the press; and these together are the hope of our country, through which medium a public sentiment can be created that will demand that a true domestic science be taught in every school in the land. To do less is to expend the substance of the people in our educational institutions with the result of handicapping our children in the race of life, and thus defeating the objects sought!

And may I not appeal to the dentists of the country, who are already organized, for organized as well as individual effort? Yours is an exceptional opportunity. Through the pain and suffering of ignorance you are brought in contact with opportunities to aid in putting into operation effective agencies. You may give advice that will arrest decay of teeth, but, better, you may advise the young mother in the matter, so as to avert in her offspring the misfortunes of the mother. And how responsive will the mother or prospective mother be, for she will readily understand that poor teeth tend to descent in the scale of life; for what young man in the enjoyment of physical vigor and intelligence would want to make a woman thus deficient his life companion? And what young woman in the prime of physical womanhood would tie herself to a man even of intelligence, as the term is generally used, or of wealth, without the proper means of digesting the food he eats? Such a man, if he does not become a tartar, is sure to be none the less a disappointment.

As dentists, can you not see in our suggestion the way for ample remuneration for your services which does not depend wholly upon the misfortunes and suffering of your fellow beings? Would it not be infinitely more wise, more humane, and to you more satisfactory to give your services, for which you charge your patrons, to prevent disfigurement and suffering rather than to repair continually the ravages of ignorance and error?

Gentlemen, I am not unmindful how impossible it is to present in these few moments anything but a few simple thoughts on this great subject,—the building of the harmonious human structure. If man may not be a man in all respects, with all his organs in perfect condition, there must have been a grievous error in the plan of creation. The fact is that man's suffering, not only as to conditions which relate to your profession, but as to all conditions of suffering, is the result of the friction of error. To achieve for man as relates to his physical structure relatively what has been achieved by men and manifest in the mechanical and dumb brute world would enable us to say of man what we say of the machine and of cattle and breeding of cattle,—the objects sought have been attained. Cannot the definite and well-rounded purpose for which

man was created be also manifest in man? Man should come first as compared with the machine or cow, mere articles of commerce, in the matter of proper development; but as man is regarded to-day he is the sacrifice that development in commerce may progress in the interest of selfishness; and this, in truth, is what we are compelled to say is the result of our present system of education.

Lest I may be misunderstood in my position in regard to our educational system, permit me to say in conclusion, and in a general way only, that practical education is too limited,—practical education by which the pupil is taught to understand not only theory, but how to do with the hands; how to intelligently create something of value; how in a practical way to be a valuable factor in the development and progress of a better civilization. Such an education will safeguard the home, safeguard and perpetuate our government, and is the only way to lead to a degree of contentment which will enable man to enjoy the good things so abundantly vouchsafed him; to a degree of contentment that will enable him to digest and appropriate into desirable living tissues, including good teeth, the properties found in the natural food he eats, and to attain to a state of physical and mental equilibrium that will cause an honest desire, and in a practical way, to fraternize with his fellow men.

HOW TO CONSTRUCT A PRACTICAL ELECTRIC OVEN.

BY H. B. FINDLEY, D.D.S., VANCOUVER, B. C., CANADA.

IF the reader of this article has had much experience with electric ovens, he will probably doubt the possibility implied in its heading; but I promise that, if the directions are carefully followed, an electric oven that will heat quickly, will fuse the most refractory porcelain and will not burn out will be the result.

Burn-outs have been my principal objection to electric ovens in general; next to that has been slowness of heating. I have overcome these two objections, and, if the crystallization of the platinum wire is guarded against, the oven should have a long life. Crystallization is caused by overheating the wire, also by fumes from over-fused porcelain. Marble-dust used for investment will instantly crystallize the wire and ruin the oven.

The oven described is bridge-work, size one inch by two and one-half inches inside measurement. The same principle can be applied to larger ovens with equal success.

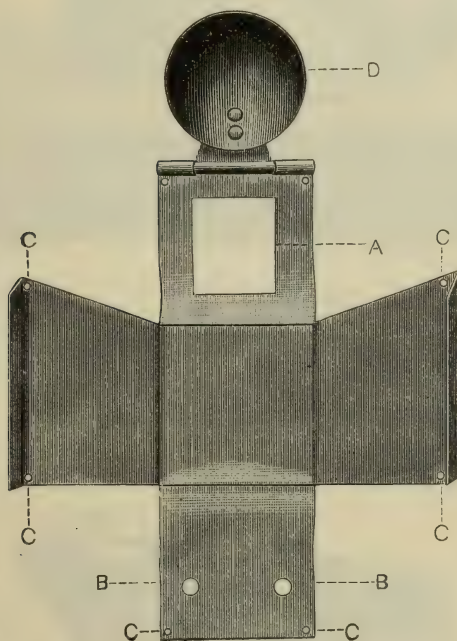
Fig. 1 is a pattern of the case; any tinsmith can make one. It is made of stove-pipe or Russian iron, and bent over at the indicated lines. A is the opening cut out one inch square. D is a concave door hinged on. (Two V-shaped slots are sawed in the door and bent in to retain the fire-clay lining; these are not shown in the illustration.) The holes C are for wiring the case together after it is bent into shape. This is done with stove-pipe wire pushed through each pair of holes and twisted on the inside. The twisted ends retain the fire-clay lining of the case.

The large holes B are for the terminal wires, and should be fitted with a small piece of clay pipe-stem to insulate them from the case.

Fig. 2 shows the furnace complete. This is not a muffle furnace; the radiating wires are all exposed, giving the best results.

The method of wiring is simple, but must be done carefully. It is accomplished as follows: Out of a cigar-box cut strips one inch wide and two and one-half inches long until you form a pile one inch in height. The center is removed from the middle strip of the pile (Fig. 3, F). A thin brad is now driven through each end, and

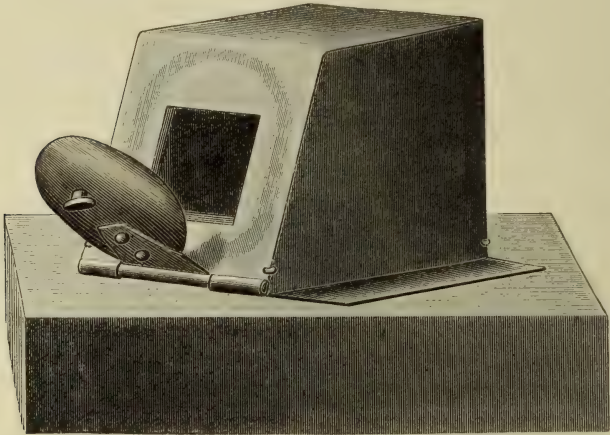
FIG. 1.



a bevel cut on one end. The whole is stuck together with wax, and the brads are gently removed. A small pin (Fig. 3, G) is driven through the top for a starting-pin. It is just long enough to catch the wire, which is wound double and evenly around the core, separated by one-sixteenth of an inch, until the end is reached. The length of the wire can be ascertained by first winding twine of the same size around. The wire should be pure platinum, gauge 26. Bend the wire two inches from the middle, hook it over the pin, and wind it double, keeping one-sixteenth of an inch space between each wire. Wax one end to the bottom of one side; carry the other one over and wax it to the bottom of the other side. Fig. 3 shows the method of holding the core when winding on the wire. E is the bottom of the core. The end wires should now be cut off to about one and one-half inches in length. The core is

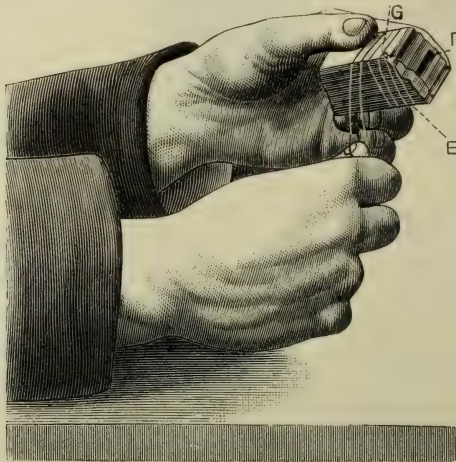
now ready to be used. A few pounds of fire-clay are obtained and sifted until as fine as common plaster of Paris. It is then mixed with water and kneaded until of the consistence of putty. The

FIG. 2.



thicker this paste the less shrinkage of the oven walls. The case is next turned upside down and fire-clay paste packed in until it comes one-eighth of an inch above the opening A. The wooden core with the wire is now laid in, bottom side up, and the terminal wires placed through the holes B, B.

FIG. 3.



The core is now pressed firmly into the clay, and at the same time moved forward until the front or beveled end protrudes through the opening A. Holding it in position with one hand, fire-clay is

packed in and tamped down the sides until the case is full. Be careful not to use too much force or the core will become displaced, thus making one wall of the furnace thinner than the other. The whole is now smoothed off with a spatula.

The door D is next filled and smoothed off, and the furnace is now ready for drying. This can be done on top of a stove, and it should be done slowly. After the clay is dry, and while the case is still hot, the core should be removed. To do this set the furnace in its normal position and with a sharp point move the pieces F to the center, and with a pair of pliers pull them out. Remove the other strips one at a time, the top one last, and carefully, as it has the starting-pin in it. It will be now seen that the wires are barely imbedded in the fire-clay. Brush out any dislodged pieces, and smooth out any rough parts with a small spatula. The oven is now ready to bake. This is done by turning on the electricity and gradually increasing the current until the terminal wires become a cherry red. Leave the door open about one-quarter of an inch, and leave the current on until the flames cease to come out. The oven is now complete.

This oven has no binding-posts, as they are difficult for the amateur to place. The copper conductor will readily stick to the platinum terminals by just laying them on. For those who have no rheostat a permanent resistance of twenty-five feet of gauge 18 German silver wire must be used in the circuit; that is, when working with a 110-volt alternating or direct current; on a 52-volt circuit less resistance is necessary. The exact resistance can be determined by gradually shortening the wire a foot at a time until the terminal wires of the oven become bright red in color.

Never heat the terminal wires above a bright red; it is not necessary, and the oven will become incandescent in a few minutes.

A FEW DON'TS.

Don't put anything directly on the bottom of your oven without a fire-clay slab.

Don't put any metals in the oven except platinum.

Don't try to pull out the fire-clay slab if it should stick; it is impossible. Heat the furnace and take it out when hot; go over the glazed surface of the oven with a little fire-clay paste and get a new slab.

THE SCIENCE OF DENTAL RADIOGRAPHY.

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(Lecture and demonstration before the International Dental Congress, Paris, August, 1900.)

THE purpose of this communication is to establish a higher and more general appreciation of the splendid services the Roentgen rays can render in the various branches of dentistry, and to give a description and demonstration of the necessary apparatus and the technique of its practical application, with a report of important new developments. Owing, however, to the vastness of the sub-

ject and the shortness of the time available, our talk must be very incomplete and disconnected.

In the routine of making a practical application of the Roentgen rays in dentistry we have to deal with the following items or factors, each of which greatly affects the others,—viz: (*a*) The source of the X rays; (*b*) the exciter; (*c*) the patient; (*d*) the photographic plate or screen; (*e*) the developing and printing, and (*f*) the interpretation of the results. Of these the patient, or condition to be examined, is the fixed factor to which the others must be adapted. The science of dental radiography consists entirely in thoroughly understanding these factors and their relations to each other.

First, the *source* of the rays. For all practical purposes this may be limited to the Crookes tubes of the focus type. The Roentgen rays are emitted at all hard surfaces struck by the cathode rays produced in a high vacuum. These rays are propagated in practically straight lines from the negative pole (or electrode) of the tube; to concentrate them the cathode or negative pole is made concave, and for this aluminum is generally used. In the earliest tubes the cathode rays were allowed to strike the glass walls of the tube, but later a piece of metal (usually platinum) was placed on the anode, or positive pole, at the point of true focus of the concave cathodic stream,—for which reason the positive, when so arranged, is often spoken of as the anti-cathode instead of the anode.

The rays are emitted in all directions from the point upon which the cathode rays fall. This can be most easily demonstrated by this lantern slide [exhibiting], which shows first the relation between the cathode (*a*) and anti-cathode (*b*), which in this tube may or may not be in the anode, it having another pole (*c*) to which the positive wire may be connected; either connection will produce the same effect. Only a small portion of the field of X rays is shown in A in order not to hide the electrodes. The second view (B) of the same tube shows the true field of emission of the X rays.

I must take for granted that you know the principal properties of these rays, such as their invisibility and their power of penetrating opaque bodies, which last property, together with that of producing chemical action and fluorescence, gives them their value. Their property of penetration tends to be in proportion to the density and thickness of the substance through which they are passing, though no exact relation has been found between its physical and chemical properties and the amount of absorption the substance will exercise. Most investigators agree that the four chief factors influencing it are "density, thickness, molecular weight, and chemical constitution." It is a universal fact, however, that twice the thickness of any substance does not have twice the opacity, but from ten to fifteen per cent. less. It is entirely upon this property of different absorbability (for the X rays) of the various parts of the field through which they pass that all radiography depends. In ordinary radiography the differences in the densities are relatively great, the substances being flesh as compared with bone, or a foreign metallic substance as compared with bone or flesh. Very unfortunately the

differences in the absorbability of the various parts from which we, in dental radiography must get contrasts, are small. This fact necessitates the most exact adjustment of the various conditions, which we shall consider later.

The penetrative power of the rays varies through a very wide range, from those that are stopped by a sheet of writing paper, or a few inches of air, to rays capable of penetrating many inches or even a foot of iron.

In any branch of radiography we can have success only by selecting rays that have just the power which renders them capable of penetrating the less opaque parts of the field and not the more opaque, according to the particular information wanted. It has been because of neglect to comply with this law that practically all the failures have been made. With tubes made under precisely the same conditions, or the same new tube under different conditions of exhaustion, it may be said that the penetrative power of the rays is in a constant proportion to the degree of exhaustion. This is not a universal law, but, according to Dr. Rollins, obtains only so long as there is an abundance of absorbed hydrogen in the cathode, the ions of which are the carriers of the electrical charges in the tubes exhausted from air containing water vapor.

It is generally the case, however, that the longer a tube is used the higher the vacuum gets, and also the greater the penetrative power of the rays. Time will not permit of an exhaustive discussion of the precise factors that are recognized as determining the penetrative power of the rays, but through a wide range it is in a ratio with the velocity of impact on the anti-cathode. Thus a tube having a resistance which is an equivalent of one-half inch air-gap will ordinarily produce rays having very low penetration, and by putting a two-inch spark-gap in series with the tube, whether from a coil or static machine, its penetrative power will be very many times greater provided the character of the secondary discharge is right.

With a proper apparatus this use of a series spark-gap is an important factor in the adjustment of the penetration of a tube in practical work. I will throw a couple of pictures on the screen to illustrate [exhibiting]. These show the penetrative power of a certain tube with and without a series spark-gap, all other conditions being the same. They were made by placing some teeth upon a wedge made of aluminum which tapers from about three-quarters of an inch (2 c.m.) to 0.65 m.m., the whole being placed upon a sensitive film. Without the spark-gap the penetration of the tube was so low that it but slightly impressed the film through the thinnest portion of the aluminum wedge, while with the series spark-gap it penetrated it to some extent throughout its entire length, producing shadows of the teeth throughout its length.

This means of varying the penetration has not a wide enough range to be universal, and is especially limited with the ordinary sizes and forms of apparatus. We must depend chiefly upon the selection of a tube for the case in hand, adjusting it to the proper condition. This can be done by varying its temperature, the quan-

tity and quality of the exciting current, and the nature and quantity of its contained gas. This latter is done chiefly by heating potash crystals contained in an auxiliary bulb and evaporating from them their water vapor, or by introducing gas, usually hydrogen, electrolytically. In the former the potash is usually heated by the electric current to the tube, being shunted off to a circuit containing the potash bulb, with a variable spark-gap in series. When, by the heating of the potash and consequent liberation of water vapor, the vacuum of the tube is reduced so that its resistance becomes less than that of the path through the potash, the current passes through the tube.

All of the many tubes employing this last principle that I have used have had two serious defects for our work: First, they are not made with a long enough spark-gap (thus not allowing of high enough penetration), and they change their vacuum very easily in operation. They doubtless are excellent for ordinary radiography, but the capacity or penetrative power of tubes for our work, particularly when working on adults, must be very much greater than for ordinary radiography; because the bone that in general surgery is required to cast a shadow (or, in other words, stop the X rays), in our work must be penetrated, and must not cast much shadow, or at least not nearly so much as the tooth, or root, or root-filling, etc., that are within it. We will return to this part of the subject later, and will now briefly consider another source of rays for radiography,—viz, those rays emitted from the newly-discovered elements, pollonium, radium, and actinium, which have been discovered within recent months by M. and Mme. Currie. I had much difficulty in obtaining specimens for experimental work.

The rays are emitted continuously from the powdered salt of the metals, usually the sulfite, and have the properties of penetrating opaque bodies, of producing chemical action (as affecting a photographic plate), and fluorescence of certain salts. They act very similarly to the Roentgen rays. They have not so great penetrative power as the latter, as far as yet determined.

I have found them to behave very similarly to such X rays as are produced from an exceedingly low vacuum tube, and have made dental radiographs with them, but, as you will see by this slide [exhibiting], they do not penetrate the bone sufficiently to make contrast between it and the tooth. You will also note a very great lack of definition, which is due to the size of the emitting surface and its nearness to the photographic plate. We hope these defects can be corrected by securing greater penetrative power, which will allow of greater distance, and by a substance producing greater volume or quantity of rays, which will admit of a smaller quantity being used or a smaller emitting area.

This picture was made through a sheet of aluminum in which was placed 1 gram (15 grains) of the salt, and which was held close to the teeth,—two central incisors standing alone in the inferior arch. This method is so simple that we may well anxiously hope that it may develop favorably. Don't wait for it, however. I have found the rays emitted from these salts to have marked

physiological effects, especially in certain skin affections, which I shall report subsequently. As yet this means of producing dental radiographs is purely experimental, and I only recommend it as such.

Returning to the Crookes tube method, we will next consider the various methods of excitation, which may be either a Ruhmkorff coil, usually called an induction coil, or a Tesla coil, or a static machine.

Time will allow of only the most general statement, both as to the methods of using them and as to their relative merits. The first, the induction coil, as its name implies, consists of a primary coil of coarse wire of a few turns wound around a soft iron core, around which is a coil of very many turns of very fine wire; and the whole is simply an ordinary transformer with a very high step, with a condenser attached to the primary. It requires about twenty thousand volts (Trowbridge) per inch to jump across any distance in air, between pointed terminals,—up to about fifty inches, or one million volts.

On account of laws of inductance and conditions of stress obtaining upon the make and break of currents passing through coiled wires, or coils passing around soft iron, it becomes necessary to have the current in the primary of the induction coil intermittent in order to produce the high tension or voltage necessary in the secondary current. In practical radiography the method and nature of this make and break of the primary is of quite as great significance as the make of the coil. A good vibrating hammer-break is perhaps the most simple, but it is not the most efficient; the later forms are, however, greatly improved. An ideal break must give a sudden and perfect make and break without a spark, with more time for the period of make than for break.

There are many forms on the market to-day of the following types:

A revolving armature with a blast of air to break the spark, of which the Edison is the chief example, and which, considering its minor efficiency and great noise, is far from acceptable. Dr. Wm. J. Morton and Mr. Caldwell, both of New York city, have devised much more efficient interrupters of this rotary type, but, so far as I know, they are not on the market yet.

Another type is that of a metal point dipping into a mercury bath under a non-conducting liquid like kerosene or a deep layer of alcohol. These have been chiefly made in Europe, and are sometimes excellent, being capable of great variation; but as usually constructed are very noisy, owing chiefly to the cheap, poor motors used. In most of the makes on the market too small an eccentric has been used, giving the plunger too short a stroke. If the plunger is made very thin, like a ribbon spring, instead of round and stiff, it produces very much less splashing. A Ritter dental lathe motor, which so many dentists have, is superior to anything on the market for this purpose, for on it the apparatus can be constructed to run almost noiselessly and subject to the most delicate adjustment of speed.

Another type of interrupter, and a very excellent one, consists of a jet of mercury thrown against revolving metal contacts. It was designed by Mr. Isenthal, of London.

In my judgment, not any of the above types of interrupters, or any others I have known of, are capable of so wide and satisfactory variation as certain particular forms of Wehnelt and Caldwell electrolytic interrupters. The former usually consists of a large electrode of lead, or preferably silver, and one of a small surface of platinum, both placed in a dilute solution of sulfuric acid. The latter consists of two lead plates or electrodes in solutions of sulfuric acid, and separated by a non-conducting partition, usually glass, through which there is a small hole or window. They greatly increase the capacity of the coil, and with them no condenser is used.

After much experience, I must strongly advise against the use of a platinum point fused into a glass tube, for it is only a certain very definite amount and shape of surface of platinum that will give the maximum results with each particular tube and coil; besides, the quality of rays can be varied considerably from the same tube by having a perfectly adjustable platinum electrode.

The Wehnelt interrupter works best on an alternating current, and produces almost a unidirectional current in the secondary when properly adjusted. The form I presented before the Ohio State Dental Society last December (see February, 1900, DENTAL COSMOS, and the *Ohio Dental Journal*, 1900) still proves to be the best I can find. It consists of three independent platinum points, and is made by soldering pieces of platinum wire of three or four inches in length and size about Nos. 16, 20, and 24, respectively (B. W. gauge), to copper or silver rods the same size, and placed inside clay pipe-stems or, better, glass barometer tubes, in which they are easily adjustable and which are not disintegrated by the heat or acid. The pipe-stem or glass tube is placed in a perforated rubber cork, through which it is easily adjustable into the bath containing the lead electrode. Owing to difficulty of finding clay pipe-stems of small enough bore, I have recently been using in the same way, and with perfect success, pieces of glass barometer tubing, well annealed, which work excellently; it can be gotten with small bore, of varying sizes, and very thick walls. I here show this good working form of Wehnelt interrupter as I have arranged it. Use a glass battery jar of about two gallons capacity, and make the top of hard rubber or paraffined wood. A single focus tube is used, and the definition seems quite as sharp as when the continuous current is used. I regret that the distance to travel prevented my bringing a complete set of various forms of interrupters, and also the other apparatus which I have found best suited for our work.

The Caldwell interrupter is usually made by perforating a large test-tube, placing a lead electrode within it, and placing the whole in a larger vessel containing dilute sulfuric acid and another lead electrode. The interruption takes place in the small hole. It works best on the continuous current, and in the best forms the size of the hole is regulated by means of an adjustable tapered glass

point. It must be remembered that every interrupter must be adjusted to the particular coil with which it is to work, and both of them to the tube and the quality of rays desired. A variable resistance or rheostat should be used in the circuit of the primary with all interrupters.

The static machine may be any of the many forms of rotating glass or hard rubber or mica plates, but must be of very large capacity, and hence large size. Different forms have advantages and disadvantages, such as being greatly influenced by moisture or not at all so, changing of polarity, relatively enormous size, and inability to light tubes of high penetration unless of very great size. I shall judge from the standpoint of a dentist and his peculiar needs in radiography, and what I have to say regarding static machines for lighting X ray tubes does not apply to the general physician's use of it, which is entirely different. It has but one strong point in dental radiographic work, and that is the steadiness of the glow of the tube for fluoroscopic work, which is not, as I will show later, a strong argument for its use in dentistry, since of necessity we shall use that method rarely; besides, it does not produce a noticeably more steady glow than can be secured with a Wehnelt interrupter. And, again, it only produces that steady glow when the resistance of the tube is very low, and consequently its penetration feeble, or otherwise when the capacity of the machine is enormous, which requires great size. True, tubes of so-called high penetration can be lighted by many of them by means of the series gap or Leyden jars, but this immediately produces the slight flickering we were giving it the credit of obviating. Moreover, the penetration required for our work, to produce the best results, is so very great that not one static machine in many hundred will light the tubes. I speak advisedly, for I have visited very many operators and manufacturers, both in America and Europe, to investigate these matters. Some very few operators in general radiography are getting really excellent results, but they have very large machines.

The various forms of Tesla coils or oscillators have much merit for exciting X-ray tubes, but time does not permit of their explanation further than to say that the nature of the current they produce is always alternating, and is of very high tension and frequency. Their current illuminates a tube beautifully and abundantly, and consequently they are capable of producing pictures with short exposures. I do not consider it such an instrument as I should advise for dental use, for the following reasons: On account of its very high tension, much more danger occurs of puncturing the tube. Most forms are not so easy and simple to regulate as a coil, and it is a very noisy generator. The first two objections are overcome by the skilled physicist, and hence it becomes an instrument better suited for the physical laboratory than for the lay operator.

In the *patient*, or rather the condition, to be radiographed we have the most exacting conditions, to which all else must be adjusted and adapted, and I say frankly that no physician, or physicist, or layman can possibly do dental radiography very successfully unless he be also a skilled dentist. By skilled dentist I mean most thor-

oughly acquainted with all the minute anatomy of all the adjacent parts, and particularly their relative densities and thickness. He must also know thoroughly all the general operations and the density of the materials commonly used, and also must know thoroughly all the pathological conditions that may be present to be looked for or recognized, especially within the teeth and bone. It is only by correctly judging the relative densities of the various parts in question and adjusting the penetration of the rays so that they will penetrate the less dense and not the more dense parts that we get any information, for our information is only obtained from the shadows produced. Without this information the operator is as certain of failure as a hunter going out to hunt game with his eyes blindfolded and not knowing anything about his ammunition, which is of the greatest possible variety.

Fortunately, dentin has a slightly greater opacity to the X rays than bone, and enamel more than dentin, and gutta-percha root-fillings, cement and metal fillings, or broken steel instruments still more than enamel. At the same time the density or opacity of the bone increases rapidly with age,—much more rapidly than that of the dentin; consequently in making radiographs for adults or old people very much more care must be taken to use rays of just the proper degree of penetration. In like manner, since the opacity is in nearly direct proportion to the thickness, such variations as are caused by the presence of a pocket in the bone, from whatever cause, will be shown in the most minute detail if rays of just the proper penetration have been used. So also natural cavities, such as the antrum and inferior dental canal, must be familiar to the operator in every detail,—as normal position and possible complication. A splendid radiograph of bone will show large bloodvessel and nerve canals, and will also show minutely the cellular structure of the bone, even its minute histology.

The proper *development* of the negative, after a proper exposure has been given, is a matter of the greatest skill and exactness, and it can only be done by one who knows just what information is desired. Too much or too little development will very often obliterate or fail to bring out the particular information desired. Suppose, for example, you were radiographing to find the actual size of a pulp-chamber, and you (or your photographer) developed until you brought out in good definition the tooth and its root or roots; on fixing, you would have no trace of the pulp-chamber; while, if it were developed to the proper point to show the pulp-chamber most distinctly, the outline of the tooth would probably appear to be seriously injured, and by all but the one knowing just what information was wanted the negative would be thought to be spoiled. And so also with most cases it is imperative, for best results, that the operator be his own photographer, and that he be a good one.

The conditions make a flexible photographic plate desirable, which suggests a celluloid film such as that used for kodaks. Since, however, we require great depth of detail, and since the rays have the power of producing almost an equal action on a great number

of films placed one behind the other, it is clearly to our advantage to use a greater thickness of emulsion than the ordinary kodak films carry, and also a heavier celluloid, on account of convenience in handling and developing, as it does not curl. I have had special film made with as many as four layers of the sensitive emulsion, one upon the other, but have gotten the best results with three layers. M. A. Seed & Co., of St. Louis, have assisted me in producing an excellent special film, and I cheerfully recommend them as careful manufacturers.

The best method I have found of preparing film for use is to take a piece of, say, four by five inches and lay a piece of bromide paper of the same size upon it with the emulsion sides or faces together. Then stick the edges of two pieces of unvulcanized black dental rubber together after taking the paraffined linen from one side of each. On this lay the piece of film and bromide paper, and over all put another side of the black rubber, allowing the edges of the rubber, where they pass beyond the film, to unite,—which they will do, as you know, very firmly by simply allowing them to touch. Of course the above must be done in a totally dark room, or with the most subdued ruby light. Dark rooms suitable for ordinary photography would fog this film almost instantly.

This piece of covered film can now be cut through with shears in any direction into pieces the proper size for practical cases, and part of it can be left for cutting at a moment's notice for a special case. Prepared in this way, they do not need to be cut the exact size and shape required for the case in hand, but can instantly be made any desired shape by simply bending a corner or end over and allowing the rubber to touch itself, which will secure it firmly and make a very smooth round corner to place against sensitive tissue. I have done much experimenting to see if anything better could be found for the coloring-matter of the rubber, but the lampblack generally used is as transparent to X rays and as opaque to ordinary light as most substances that are also suitable, and the ordinary black rubber can be had from any dental dealer. Red and pink dental rubbers are exceedingly opaque to the X rays, and make most excellent screens for various purposes, such as shields and for covering the tube to cut off stray X rays and fluorescent light in fluoroscopic work, and have the advantages of lightness, easy adaptability, and non-conducting or insulating properties. It is an advantage to have the manufacturer of your dental rubber cut you some black about five by six or six by nine inches. The latter folds easily over a four- by five-inch film.

I have carried on some extended experiments with the treatment of photographic plates and films, with the view to increasing their sensitiveness to X rays and thereby shortening the time of exposure, particularly with such chemicals as would tend to make them orthochromatic or sensitive to the rays of the lower part of the spectrum, on the theory that the emulsion changed the order of some of the ether waves. My experimenting has been with quite satisfactory results, the sensitiveness of the film being increased from thirty to fifty per cent. with some treatments. In brief, the

best found consists in dipping the film into a solution of erythrosin for about two minutes and allowing to dry in total darkness. After this is done, it cannot be exposed to even a ruby light, and must be used within a fortnight. I have recently, however, made such improvements in my own radiographing apparatus as to so far reduce the time that this means was not necessary or desirable.

When X rays fall upon certain salts they cause them to fluoresce; the chief of the salts so affected are calcium tungstate and bario-platinum cyanid; the latter is usually considered the better. When this salt is evenly distributed upon a card or board, and the rays are allowed to strike it, the illumination or fluorescence is very bright, and any opaque object placed in the path of the rays will produce a shadow. This you all know as the fluoroscope. It is, I think, applied best in dentistry by placing a small screen of it, made in the shape of a large mouth-mirror with the face turned the opposite way, into the mouth behind the condition to be examined, and then viewing the shadow cast upon it direct or with a mouth-mirror. These are good forms and simple [demonstrated]. When using this method the X-ray tube should be covered with something to entirely shut off its white light. A heavy black cloth will do, but the rubber spoken of is better. Use black over the part where the rays come through, and red elsewhere over the entire surface of the tube. This method of using the X rays requires a totally dark room, and that the eyes of the operator be well accustomed to the darkness. A large fluoroscope held against the outside of the face, with the tube on the other side, will sometimes show something, but comparatively faintly; besides, the shadows of the teeth of the opposite side seriously interfere. This last objection is overcome by placing a tube inside the mouth, of which I shall soon speak.

No part of the work requires truer skill than the *interpretation* of the negative or the positive it produces. A most intimate acquaintance is absolutely necessary, not simply with the anatomy of the parts, but with the relative densities. The normal positions and relations must be known, and, as important as anything else, the angle of incidence of the rays; also the relative positions of the film and parts radiographed, to each other and to the rays, particularly the point from which they are emitted. This makes it necessary that the operator keep a complete record of the distance of his tube from the film, and the direction or angles; also a record of the relation of the film to the parts.

By having a systematic method of charting, this becomes very simple, as I will show in this slide [exhibiting]. You will easily understand it, unless it be the plan of recording the angles. In the first the heavy black line represents the long axis of the tooth, and the dotted line its perpendicular. The line marked *a* represents the plane of the photographic film, and the other, with the arrow sign, the angle of the rays to the tooth and film. The second shows the lateral angle of incidence of the rays, the dotted line representing a perpendicular upon the natural plane of the tooth, which is the heavy line, and the pen line the true angle at which the rays struck this plane,—in this case about fifteen degrees to the right. Imagine yourself looking down upon it.

We have now come to the most interesting and practical part, the technique of actual application. I should like to have been able to devote my whole time this afternoon to this part of the subject, for much of what I have given could be gotten elsewhere, but it was necessary in order for an understanding of this more practical part.

First of all, have the patient comfortable. This is very desirable and perfectly practicable. Probably half of our patients will be children, and everything possible should be done to make the operation seem as harmless, insignificant, and simple as possible. My best judgment and experience is to place patients in the dental operating chair, make them as comfortable as possible, and leave them so, except the natural tipping of the chair or rotating of their head.

Now adjust your apparatus to the patient, which is exceedingly simple.

Secure a small plate-glass-top table the length of the base of your coil and about ten inches wider, and of ordinary height, with a glass shelf midway below. The table must be mounted on rubber-tired wheels not less than four inches in diameter. On the shelf place your ammeter. On the top place the induction coil, which for our work should produce a ten- or, better, twelve- or sixteen-inch spark, also the tube-stand and a timepiece marking seconds. Place the timepiece so you can at the same time see through the glass top to watch the ammeter below, which is an indispensable part of the apparatus. Such a table can be had from or made by any maker of hospital furniture. Cast a heavy lead ring to load the base of the tube-stand if it be not already heavily loaded. Have a tube-stand that is itself a non-conductor and compact. It does not need a very long extension.

Wrap some unvulcanized dental rubber around the stem of the X-ray tubes to clamp on to; it holds the tube firmly, without danger of crushing. Use very heavy wire with all good connections for the primary circuit; for the secondary to the tube a light wire will do, but it must be well insulated and, better, without any free points. This high-potential secondary current leaks off very rapidly from a bare wire or from exposed points or around a short tube. With a static machine half the energy may be lost from a few feet of bare wire or from an exposed point. The coil or interrupter, or both, could be elsewhere in the room, as on a bracket on the wall, except for two reasons: First, the desirability of having both within easy adjustment while operating, and, secondly, the difficulty of conducting the high-potential secondary current without loss. The wires carrying the secondary current can be best insulated with what is known as high-pressure gum tubing, which has very thick walls, such as I have here. Lead fuse wire inside makes an excellent and very flexible conductor.

Nothing whatever, besides the operator's fingers, is necessary to hold the sensitive film in place in the patient's mouth, and with this arrangement of apparatus the operator can hold the film with the fingers of his right hand, with the thumb and hand steadied against

the face, by which he can detect the slightest displacement of the film; and with the left hand he can control and regulate every part of the apparatus and see everything. Every desirable angle can be secured in this way with perfect convenience to both the operator and patient. When radiographing either left or front superior or inferior conditions, roll the table to the left side of the chair and stand behind the patient. For the various positions of the right side of the patient, place the apparatus on the right or slightly back of the patient, with the operator standing forward on the right.

With the movements of the dental chair, tube-stand, and table, every possible dental condition can be radiographed with perfect ease for both patient and operator. For radiographing anterior superior conditions, it is especially convenient to tip the chair back to the reclining position and place the apparatus behind, with the tube above the patient's forehead.

This slide [exhibiting] shows the apparatus in position for a left-side exposure.

To have the apparatus working *quietly* is a very important item for the comfort of the patient. The two chief sources of noise are the interrupter of the primary circuit and the series or parallel spark-gaps of the secondary. It is a most lamentable fact that many forms of apparatus are put on the market that make as much racket and demonstration when running as a small foundry or nail-factory. They frighten women and children exceedingly, which is entirely unnecessary. First, do not use any but a comparatively quiet interrupter; and, secondly, place it on a sawdust or inclose it under glass or place it in a tight box.

Using a large mass of liquid in a Wehnelt or Caldwell interrupter and covering it in this way, or in one or two tight boxes, it makes scarcely more noise than a boiling tea-kettle, if heard at all. When a heavy spark from the secondary takes place in the air it makes a report like a pistol, and hence a spark-gap in series with the tube is very noisy. It is also very often desirable to test the internal resistance of a tube, which is most easily done by adjusting a spark-gap parallel with the tube, gradually closing it until the current will jump across rather than go through the tube. This also makes much noise. This is not, by the way, a constant expression of the resistance of the tube, nor even relatively, unless a constant volume of current is used which is impracticable. It is, however, very useful, and the noise from it, as also from the series-gap, can be almost entirely done away with by having it occur within a heavy glass tube (suggested by Professor Andrews).

Since these secondary series-gaps aid so much in regulating the penetration of the tube, it is desirable to be able to change them while the tube is glowing. But we cannot put our hands near them on account of getting a shock. I have overcome these difficulties by mechanical appliances, one of which I have here to show you. They cause the spark to take place within the glass cylinders attached to the heads of the coil, and both positive and negative series-gaps and the parallel gap are under perfect control close beside the switches of the primary current, all of which are within

easy reach of the left hand while holding the film with the right. This is a material improvement.

The length of exposure is dependent upon the volume and quality of the X rays, the sensitiveness of the film, the information wanted, and, most important, the distance of the tube from the film. Some early investigators suggested, upon the theory of radiant propagation, that the time should be inversely as the square of the distance, as with light. Vandevyver (*Journ. de Phys.*, 1897, page 23) and others have stated it to be inversely as the distance instead of the square of the distance. As this point is exceedingly important, I made many experiments to establish it, and I think this one slide [exhibiting] does so, as do others made with tubes of different degrees of penetration.

This shows three sections of a plate exposed separately to the same tube under the same conditions except distance and time. No. 460, the section to the left, shows the action on the plate with the tube six inches away and a ten-second exposure. The center section shows the result with the time adjusted to the distance inversely as the distance, which was six times the first, or thirty-six inches, and hence the time sixty seconds. You observe that the action on the plate is very much less than the first. The third section to the right shows the result with the time inversely as the square of the distance, or thirty-six inches and six minutes, which is as nearly as is appreciable identical with the first exposure; from which we may conclude that approximately the time should be inversely as the square of the distance.

By far the most difficult part of the technique of application is the securing of rays of proper penetration. Unfortunately, there never has been any standard adopted, and we have no way of expressing rays of various qualities, which would be a matter of very great advantage. Roentgen discovered that the ratio of absorbability of different substances was not proportional to their thickness, and was different for different substances. On this hypothesis he made a radiometer of platinum foil 0.0026 m.m. thick, with fifteen circular windows. In each of these he placed one additional number of disks or panes of aluminum foil of 0.0299 m.m. On passing the rays through this the penetrative power of the rays was determined by noting the number of windows in which the absorbability was the same in the platinum and aluminum. This idea is excellent, but, since we require rays of such high penetration as to pass with great ease through half an inch of aluminum, this method becomes impracticable. Besides, it is very hard to read accurately, and has not a wide range unless made very large. I have used with good success a wedge of aluminum eight inches long and one inch wide, and built up of layers each 0.65 m.m. thick and each layer one-fourth of an inch shorter than the last. One edge of the wedge is covered with lead plate overlapping the faces one-fourth of an inch, and each step numbered with lead figures. A radiograph of it has already been shown. With it and the fluoroscope one can judge as to the penetration of the rays with great accuracy, from the distance to which it is transparent as compared with the opaque lead backing. This gauge has a great disadvantage in size.

The conditions demand that we have a gauge which we can not only use with the fluoroscope, but also with each practical case, and both test our work and also secure an accurate history of the rays used in each case,—preferably upon the negative itself. We can not judge one case accurately by another, for it is scarcely possible to get two cases with the conditions identical.

I am glad to be able to recommend to you a radiometer which answers largely all these desirable features, and at the same time is very cheap and easy to secure in a pure form. It is made of pure copper rolled accurately to 0.1 m.m. thickness and built up in twelve steps,—the first being one inch wide and any length, say six inches, and each succeeding layer one-twelfth inch narrower and the same length. Put a piece of lead or fuse wire in the thick side. Flood each side with rubber cement or glue, and wrap with a turn of thin, strong paper and dry. From one end cut with shears some small gauges, about one-eighth inch wide, which can be laid on the end of the film where it extends beyond the teeth when radiographing. From this you will secure, on developing, a correct record of the actual rays used and their suitability for this case,—which is the short road to success, for from the information thus gained, and a larger scale or gauge made in the same way, and the fluoroscope, you can tell when you have secured the proper rays for the next similar case.

I have tabulated the opacity of the various structures as compared with this standard, determined with the fluoroscope and photographs from a number of skulls, as well as from practical cases, and find the thickness to make considerable difference, as expected. Dry skulls have much less opacity than in life, and teeth give much greater contrasts. Watch for this in all exhibition radiographs, for it is easy to get good pictures of teeth in dry bones.

The bone of the inferior maxilla of children in life has an opacity about equal to 0.15 to 0.3 m.m. pure copper, adults 0.2 to 0.4 m.m., and old people 0.2 to 0.5 m.m.

The bone of the superior arch of children, from 0.2 to 0.35 m.m., adults 0.25 to 0.45, and old people 0.3 to 0.6 m.m.

The opacity of dentin is difficult to determine, because the thickness varies so much, but is usually about equal to 0.05 to 0.1 m.m. more copper than the bone of children, and 0.05 with adults, and 0.05 to nearly zero in old people. Of course, the bone being thinner through the inferior maxilla, the contrast is greater between it and the dentin of the roots.

The opacity of the enamel of all ages is equal to from 0.1 to 0.4 m.m. greater than that of the dentin.

Gutta-percha root-fillings are, fortunately, quite as opaque as enamel, and fillings of the cements and the metals more so. Broaches are much more opaque than enamel. This slide (Fig. 1) shows a standard of 0.1 m.m. steps, also dry bone, dentin, enamel, a root-socket, a Donaldson broach, a white and a pink gutta-percha point, the pulp-chambers, the dental canal, and the cellular structure of the bone.

In practical work select the rays that will not penetrate the more opaque structure, but will the less so; and the more accurately this selection is made the more distinct will be the shadow. You will all understand now why pictures taken with rays that are not penetrating enough fail entirely to show contrast or definition. Fortunately, tubes give out a mingled variety of rays as regards their penetrative power, though a majority will have approximately the same. This is to be seen in any of the slides showing a radiometer gauge (see Fig. 1). This characteristic is not an unmixed advantage, for, indeed, it is usually a disadvantage. Happily, it can be remedied somewhat by regulating the nature of the secondary discharge. It is only because there are some (though relatively few)

FIG. 1.



rays of high penetrative power emitted from tubes of really low power that, by allowing the apparatus to run long enough, a picture—though a poor one—is possible.

Strive to produce in the tube as limited a variety of rays as possible, and adjust for the majority.

I must speak of the methods of *making radiographs by placing the tube within the mouth*. This sounds formidable, but is thoroughly practicable, and was done first by Dr. Wm. Rollins in 1897. There are two chief methods. The first is by the placing of a very small tube in the mouth, or one with a large auxiliary bulb outside, and attaching the negative wire from a mild static current to the cathode terminal and the positive to a pad on the back of the patient's neck or elsewhere. The connection is made to the positive terminal, which is inside the bulb in the mouth (and which carries the anti-cathode) by means of a metal tip on the end of the bulb, which makes contact with the soft tissues of the mouth. It is not very painful, though very disagreeable. The other method is similar, except that the patient is in electrical contact with one side

of a condenser of large capacity or the earth, the discharge taking place through the tube. The current from either a static machine or an induction coil can be used. The positive wire is grounded, and has an adjustable spark-gap and is connected to a metal handle, which supports the tube and which is held by the patient. The metal of the handle is connected to an aluminum sheath which covers the bulb to prevent accident from breakage, and also to make connection with the positive pole. A specially complete arrangement of this method has been presented by Dr. Bouchacourt, of Paris. Compared with the ordinary methods, it is very disagreeable to the patient; and, in fact, I think few children could be induced to tolerate it.

However, neither of these methods is practical as compared with the more simple method, since the point of emission is so close to the object to be radiographed. Suppose the tooth to be radiographed is a second bicuspid, one inch long, and the point of emission of the rays is inside the mouth one inch from the crown, and on a line even with its morsal surface. The nearest the photographic plate or fluoroscope could get to the tooth outside would be about three-fourths of an inch, then the shadow of the tooth would be one and three-fourths inches long, as shown by this diagram at A [demonstrating]; and nearly all this distortion would be of the root, the only part wanted. Imagine the distortion of an abscess at the apex of the root. As a matter of fact, the shadows of the apex of the root and an abscess, if there were one, would have to pass through the anterior portion of the zygomatic arch, a dense bone, and would be lost on account of the dispersion. The same tooth radiographed with the tube outside and ten inches from and at right angles to the film, which would be placed against the arch on the inside and would necessarily bear away from the root, would produce exceedingly slight distortion, as shown at B [demonstrating]. The latter, on account of its length, has the extension lines cut off.

By keeping a record of the lateral and elevation angles and distance, the exact position of any part can readily be determined. It is also well to keep for comparison a complete record of the case and conditions when radiographed. Since it is practically impossible to identify negatives or prints when they get mixed up, especially when you get a lot, it is a great advantage to have a simple means of numbering them. The best way I have found is to place a small metal number upon the outside of the film on the part extending beyond the teeth. This number will be radiographed upon the negative, and will appear, as you observe, upon all prints made from it. The number is put into the record at the time of making the exposure. (These numbers are very easily made of fine lead fuse wire and stuck with paste on a sheet of paper, which is afterward cut, so that they may be readily torn off as needed.)

There are a great many practical points that should be brought out, like tricks in developing the negatives, controlling the vacuum of tubes, etc., but time forbids. Those interested can get more detail in a book, by the speaker, on "The Applications of Electricity in Dentistry," which is nearly ready for publication.

Develop slowly with a weak developer, one that will not stain, and aim for detail, not contrast. The thickly-coated films referred to I leave in the developer from one to two hours.

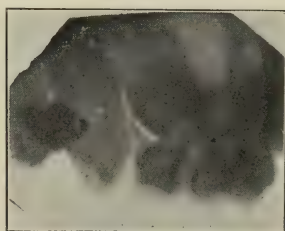
I will now show a few slides of practical cases, which represent only a small portion of the field of application.

The first slide (Fig. 2) shows the method of using the radiometer, which here was much larger than need be, and had steps 0.1 m.m. thick. This is a case of delayed dentition in a boy of seven-

FIG. 2.



FIG. 3.



teen years. You see the enamel sheath of the unerupted canine distinctly from the dentin, and it has never formed properly at the tip. This tooth has advanced one-eighth of an inch in one year.

The next slide (Fig. 3) shows the small amount of correction nature has made in three months in a deformity due to but one bicuspid forming, and that the first. It developed backward against the first permanent molar and locked. The superior arch on this side was greatly depressed, causing an intruded bite.

Nature was making practically no advancement in correcting the deformity of the position of the bicuspid, which was rotated about half around, as you see. The deciduous molar was extracted and an appliance adjusted to place the canine in its proper position to permit the bicuspid to advance, which, as you see by the next slide

FIG. 4.



FIG. 5.

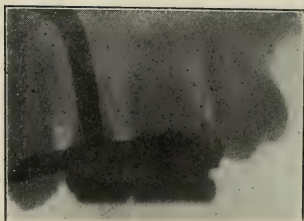


FIG. 6.

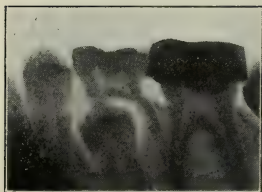
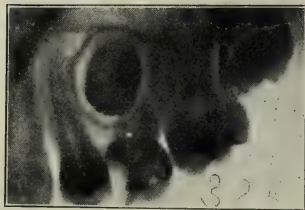


FIG. 7.



(Fig. 4), it has done marvelously in sixty days' time, and it has rotated. In this you see a radiometer in place. The same one can be used indefinitely.

Fig. 5 shows the movement of teeth in orthodontia, roots and all, keeping the long axes of the teeth parallel. These teeth were normally touching.

Fig. 6 shows a delayed bicuspid in a boy of fourteen years. The

deciduous molar is very firm, and you see the reason: the distal root is not absorbed.

Fig. 7 shows another retained deciduous molar, which is also very solid. Its successor is forming, but it is malposed; it is erupting lingually at about forty-five degrees, and is not producing absorption of the deciduous molar.

Fig. 8 is a case of delayed dentition (age fifteen), but in this case the permanent laterals have never formed.

Fig. 9 shows the teeth of a baby at fourteen months, when none of the deciduous set had appeared. Not only are they to be seen,

FIG. 8.

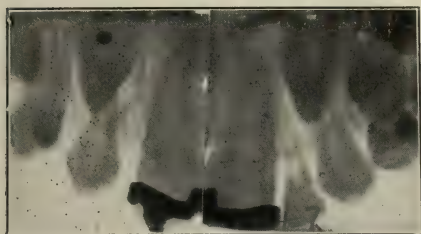


FIG. 9.

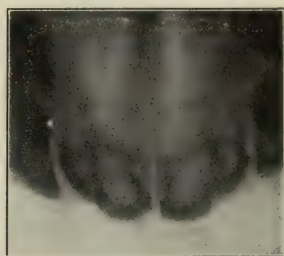


FIG. 10.



FIG. 11.



but also the tips of the forming crowns of the permanent centrals and the crypts of the laterals. This is of special interest, since the child's father has not his permanent laterals; and even before the baby has got a temporary tooth we know he will get the permanent teeth which his father lacks.

Fig. 10 shows a supposed abscess having a fistula, which proves to be a so-called pyorrhea pocket. It was treated by root-amputation.

Fig. 11 shows that the missing bicuspid is not causing this obscure abscess, in the fistula of which a lead wire was placed for radiographing. The bicuspid has never formed. The abscess clearly comes from the lateral, the apex of which is much absorbed. Note how plainly the floor of the antrum shows, and its most dependent point.

Fig. 12 shows the cause of an aggravated case of obscure neuralgia, which is an abscess from a putrescent pulp; the tooth furnished no abnormal symptoms.

FIG. 12.



FIG. 13.

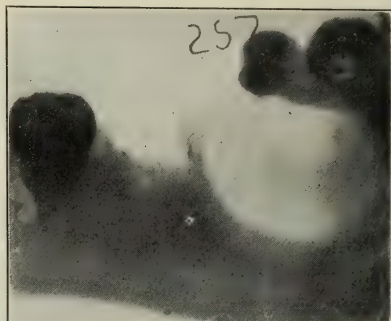


FIG. 14.

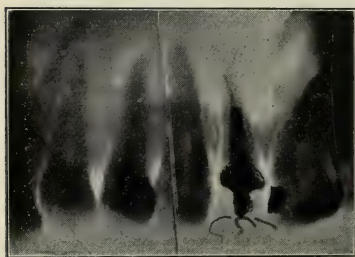


FIG. 15.

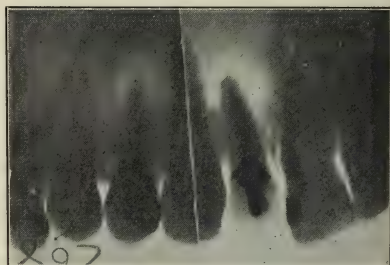


FIG. 16.



FIG. 17.

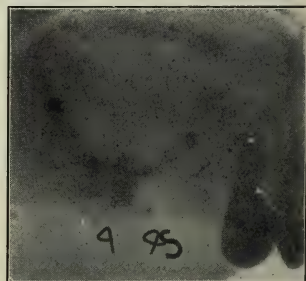


Fig. 13 shows a very large abscess of the inferior maxilla, which it has cut quite half in two.

Fig. 14 shows the extent of absorption of the bone from an abscess which made its demonstration and fistula beside the second bicuspid. The radiograph showed it to come from the lateral,

which was treated accordingly by the amputation of its apex and the abscess thoroughly drained at its most dependent point, marked x. Repair was very rapid, and the next slide (Fig. 15) shows the extent to which the bone was redeposited in three months.

Fig. 16 shows the position of a retained canine of a lady aged eighteen. The clinical evidence was very strong against its having formed. On extracting the deciduous canine and attaching an extruding appliance it came to proper position in a very short time.

Fig. 17 shows the antrum of a lady about sixty. She had suffered with acute empyema for some years. The radiograph reveals a root penetrating the antrum, but entirely buried. This is the only picture that has been retouched a particle, and in it the root was intensified, the negative being weak.

Fig. 18 shows an impacted lower third molar. It was treated by first extracting the second molar, and then the third, after which the roots of the second were filled and it was replaced. Apparently excellent results.

FIG. 18.

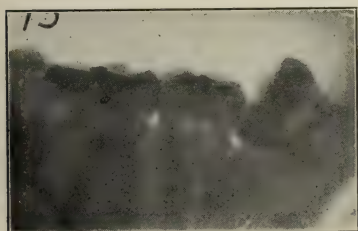


FIG. 19.



Fig. 19 shows a case that was operated upon unsuccessfully for the extraction of a supposed impacted third molar which had a fistula externally. The radiograph shows that no third molar has ever formed, and also shows an abscess at the apex of the second molar, which later proved to be the cause of the external fistula.

Another radiograph [exhibiting], which is the last, shows the great service of the rays in opening into a blind abscess. In this case there was a blind abscess connected with the superior central incisor, and this abscess was developing back around the lateral. When drilling through the process to get to it to make an artificial fistula, which became necessary, I could not be sure of the accuracy of the course or distance. When I thought I had reached it, I placed a piece of lead wire into the artificial fistula and made a radiograph, which showed that I had not quite reached it, though in the proper course. The second picture shows the next test, which proved the success of the work.

I forgot to mention before that the piece of bromid paper placed with the film would develop in a few seconds, giving you a very quick picture, though not a splendid one as compared with the negative.

CORRESPONDENCE.

A REPLY TO DR. W. E. WALKER.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—Dr. W. E. Walker, of Pass Christian, Miss., published a communication in the DENTAL COSMOS of March, 1901, which, unfortunately, was very misleading, and as president of the Southern Branch of the National Dental Association I feel that I should make a reply.

At a called meeting of the Southern Branch, held at Old Point Comfort during the meeting of the "National," August, 1900, it was decided that the Southern Branch would hold its next meeting at Lookout Mountain, leaving the time to the Executive Committee. The hotels there not being open except in the summer, and after careful inquiry by the president as to the question of hotel rates, it was found that there was some doubt as to their being open, and also that no favorable rates could be secured.

These facts were placed before the Executive Committee, and in turn communicated to different members of the committee, and it was decided that it would be bad judgment to meet at Lookout. Several places were then suggested as a new place of meeting, and after a careful ballot it was found that Hot Springs, Va., had not received a single vote, and Nashville, Tenn., receiving more votes than any other place, was declared the place of meeting, and the time July 30, the week previous to the meeting of the National, so that members of the Southern Branch could go from Nashville to Milwaukee, which would greatly reduce their expenses.

It was then found that the Faculties Association met on Thursday before the National, so our day was changed to Monday, July 29. The Executive Committee of the Faculties Association kindly postponed their meeting until Friday. This gives the members of the Southern Branch who are members of the Faculties Association ample time to finish their business in Nashville and proceed to Milwaukee.

I received this information from Dr. V. E. Turner, chairman of the Executive Committee, on February 2d, and communicated the same to Dr. Walker February 4th, so that he should have had these facts before him when he wrote the DENTAL COSMOS letter. If he did not have the facts when he wrote, he had them in time to countermand the communication which appeared in the March DENTAL COSMOS.

In several communications to me and others, Dr. Walker has referred to the demise of the Southern Branch of the National Dental Association; or possibly, from what he says, it will commit suicide at Nashville or die from some other unknown cause, and he seems determined to be chief mourner or pallbearer; but from the interest manifested by the members of the Southern Branch we fully believe that if he comes there he will find a very lively gathering.

THOS P. HINMAN, *President S. B. N. D. A.*

ATLANTA, GA., March 18, 1901.

PROCEEDINGS OF SOCIETIES.

THIRD INTERNATIONAL DENTAL CONGRESS, PARIS.

(Continued from page 383.)

FOURTH DAY—SATURDAY, AUGUST 11, 1900—*Continued.*

SECTION III.—OPERATIVE DENTISTRY; SPECIAL THERAPEUTICS.

SECTION IV.—GENERAL AND LOCAL ANESTHESIA.

SECTION V.—PROSTHESIS, DENTAL ORTHOPEDIA, AND FACIAL RESTORATIONS.

[JOINT SESSION—*continued.*]

THE president then called on Dr. F. DUCOURNAU, who read his article entitled "The Importance and Usefulness of Treating Decayed Teeth of the Deciduous Set."*

Discussion.

Dr. ROSENTHAL, SR. In the communication by Dr. Ducournau two points are not in line with the advance of dentistry. He has told us that when a deciduous tooth is attacked with caries of the third degree he begins by applying a dressing; then he makes an application of carbolic acid, and at last inserts a temporary filling of gutta-percha. He then continues the treatment, and inserts the permanent filling after three or four sittings. It seems to me that this method is an old one. When the pulp has been cauterized and when we operate under absolute aseptic conditions there is no necessity of applying so many dressings. We should be sure of our asepsis in order to fill the root-canals in one sitting. When we have applied a caustic to a temporary or permanent tooth the operation of filling the canals should be done at the same sitting. The principles of general surgery must be followed, and no drainage is established when we have to deal with an aseptic wound; on the contrary, it is closed, and a cicatrix is formed. This is what we ought to do in dentistry. With the method of applying antiseptic medicaments for several days there is a greater risk of producing an irritation than by closing the wound. And what I have said applies equally to the permanent as well as to the deciduous teeth. I will say that a single dressing is generally all that I need for disinfecting and filling a canal.

Dr. Martin told us that in a front tooth he puts cement, and that in the molars he uses amalgam. In the deciduous teeth we generally encounter saucer-shaped cavities, and, as the pulp of deciduous teeth is so large in comparison with the size of the tooth, it is impossible in many cases to give to the cavity a retentive shape without exposing the pulp; hence it is very difficult to anchor amalgam fillings; they remain in for a day or two, and then fall out.

There is a method that was recalled by Dr. Broussel, which con-

*This paper was published in the October, 1900, issue of the DENTAL COSMOS, vol. xlii., page 1017.

sists in making use of the solidity of amalgam and of the adhesiveness of cement. The amalgam is prepared in the ordinary way, and is mixed with the cement in the mortar. In that way you will not need any anchorage, and the filling will remain *in situ* through the adhesiveness of the cement.

Dr. DUCOURNAU. I am not a partisan of filling the canals in one sitting. I have tried it. I know that sometimes the operation is successful, but the failures recorded are also numerous. I would like to see the definite results of these operations. It is certain that some cases are successful, but many are pure failures, and as a matter of precaution I prefer to wait. Every exposed pulp is an infected one; hence it must be disinfected. And do you know whether a tooth is aseptic after even six months? With regard to the mixing of cement and amalgam I will say that I have never tried it, and I never do it, but I do not criticize it.

Dr. HESSE. Dr. Rosenthal has told us that the method of Dr. Ducournau is not in accordance with the advance of dentistry. He should have said that it was not in accordance with his methods, for the individual *modus operandi* may be different.

Dr. ROSENTHAL. I hope that I have not offended Dr. Ducournau. I should feel very much grieved had I done so.

Dr. DUCOURNAU. Oh, no. I have concluded my article, and I ask that the discussion be closed.

Dr. ROSENTHAL. With reference to the result that I obtain, I am willing to prove it to those who desire to convince themselves. I do not know more than anybody else, but with my aseptic method ninety-eight cases out of one hundred are successful.

The PRESIDENT. The next number on the program is an article by Dr. W. Price.

Dr. W. PRICE then read his paper entitled "The Science of Dental Radiography."*

Discussion.

Dr. CUNNINGHAM. I think that we should tender our thanks to Dr. Price for his communication, which is not only interesting, but also extraordinary. It is the first time that I have seen a demonstration of dental radiography which has convinced me that it is a useful and necessary thing for our profession. It is regrettable that Dr. Price should not have been able to show us in a more detailed manner how he has been able to reach such extraordinary results. I have had to make operations of this kind, and I have worked a little on this question. I saw then the considerable difficulties which are met with in this line of work. All these difficulties were so easily vanquished by Dr. Price that I am happy to consider him our *maître* in radiography.

Dr. MARTIN. I have nothing to add to the words of Dr. Cunningham except to thank Dr. Price for his interesting paper.

*This paper is printed at page 483 of the current issue.

SECTION V.—PROSTHESIS, DENTAL ORTHOPEDIA, AND
FACIAL RESTORATIONS.

The president, Dr. Martinier, called the meeting to order at 4 P.M. Dr. JULES LEFEVRE read his article (which here follows) entitled

FRACTURE OF THE INFERIOR MAXILLA IN A PERSON SEVENTY-TWO
YEARS OLD.

On May 19, 1899, Mons. V., of Rully (Calvados), seventy-two years of age, had the lower jaw fractured in three different fragments by the impact of a stone. The lower lip was completely lacerated, but healed by first intention. The patient came to me two months after the accident had taken place. There was an abundant suppuration in the mouth, and a double fracture of the inferior maxilla. I observed (1) a complete vertical fracture of the inferior maxilla between the right canine and lateral incisor; (2) a second incomplete fracture between the two central incisors; (3) a third horizontal fracture between the two preceding fractures and a little above the roots of the incisors; (4) a very extended abscess between the mucous membrane and the external surface of the right horizontal portion of the maxilla; (5) abundant suppuration of all the lacerated portions and of the neighboring tissues.

The condition of the patient was very serious, inasmuch as a purulent infection was feared. After a careful examination of the existing conditions, I decided to operate immediately. It was impossible to administer a general anesthetic, as the condition of the heart contraindicated its use. We used local anesthesia, produced with ethyl chlorid.

The anterior portion of the inferior maxilla inclosed by the lines of fracture was rapidly removed; the mucous membrane which covered this portion was previously removed with a bistoury. They united and healed by first intention. The lower inferior canine and one of the central incisors were extracted; they were quite loose, and there was not enough bony substance to hold them in place.

The abscesses were lanced, and the pus was drained. An appropriate treatment was prescribed. The patient was directed to wash his mouth very frequently with solutions of boric acid, and to inject into the deeper portions the antiseptic solution in order to remove all the pus present. It was impossible to employ stronger antiseptics, such as mercury bichlorid, carbolic acid, etc., as the patient might have swallowed some of the solution.

During the treatment a few bone-splinters were removed. Finally the patient recovered; unfortunately, however, the loss of bony substance would not allow the jaw to perform its functions.

I made for the patient a gold plate which will supply the lost part of the maxilla and the corresponding teeth. With this appliance he can easily masticate his food.

The PRESIDENT. I would like to ask three questions of Dr. Lefevre, in order to make his communication a little plainer. You said that you removed the fragment. Was it loose?

Dr. LEFEVRE. Yes.

The PRESIDENT. I did not catch that in the paper. You said that there was an enormous amount of pus in the mouth; this had caused an infection. Did you make a rapid disinfection?

Dr. LEFEVRE. The first thing I did was to wash the parts with a solution of boric acid.

The PRESIDENT. You disinfected thoroughly the mouth with a boric acid solution?

Dr. LEFEVRE. Yes; with a three per cent. solution.

The PRESIDENT. You might have used something more active. Fractures of the maxilla are serious, especially in old subjects. It is evident that you obtained a very good result with your appliance.

Dr. CH. WEBER then read his paper (of which an abstract follows) on

THE VARIOUS RETAINING METHODS USED IN DENTAL PROSTHESIS.

When we have to make a prosthetic piece, the examination of the mouth—and by this we mean the examination of the mucous membrane, of the remaining teeth, of the articulation, and of the relation of the maxillæ—will determine the kind of appliance to be used, also the color of the teeth, together with the modifications that should be brought about in the mouth so that the appliance should be neither annoying nor ungraceful.

After the impression has been taken and the model made we reach the most difficult and most delicate part of the operation,—namely, the problem of determining the manner of retention of the appliance. Here the practitioner will have an opportunity to reveal his professional ability. He will have to take into consideration the existing conditions, and will have to make his appliance according to the rules and laws of mechanics.

Definition. What do we mean by the retention of an appliance? It means to fix the appliance in the mouth in such a way that it shall remain in position and be useful for the three important purposes of mastication, phonation, and of securing regularity of the features. Retention is obtained by mechanical or physical means.

We have grouped the modes of retention in two classes: those used in *ordinary prosthesis* and those used in *orthopedic prosthesis*.

I. *Methods Used in Ordinary Prosthesis.*

Ordinary prosthesis comprises, first, metallic or plastic bases used as supports for teeth intended to substitute the natural organs, and, second, appliances which do not cover the roof of the mouth. The latter variety of appliances comprises what is called *bridge-work*.

We will first discuss the means of retaining appliances which cover the roof of the mouth. We must consider two kinds,—the mechanical and the physical devices. I will not talk about those methods whose use has been abandoned, such as the fixation of an appliance to the palate by wires passed through the mucous membrane, or that more singular method of inserting pivots into the substance of the maxilla in order to retain the piece in position.

The mechanical variety of retentive methods comprises clasps, springs, pivots, and wedges; the last two devices are rather of auxiliary nature.

Clasps. A clasp is a metallic band which encircles totally or partially the crown of a natural tooth and is attached to a plate and serves to maintain the appliance in position. This definition embraces our idea of the use of clasps, but it is an incomplete one, as it does not embrace clasps made of rubber, which have a similar but less intense action. When clasps are to be used for the purpose of retaining partial plates, the condition of the teeth that will support the clasps has to be taken into due consideration. All cavities must be filled before a tooth is clasped, in order to avoid receptacles for food *débris*, which increases the danger of disintegration. It is not absolutely contraindicated to adapt a clasp having some mobility, if this be not of pathological significance; in such cases it is necessary to give to the clasp a maximum amount of elasticity. The form and situation of the teeth to be clasped have also to be taken into consideration. The straighter and more parallel the walls of a tooth are the easier it will be to clasp it, and the contrary is the case if the form of the tooth is such that the neck is very constricted and the masticating surface very large. The teeth of conical form, as the canines and sometimes the third molars, are very difficult to clasp. The position of the teeth is also of great importance; incisors, canines, and third molars should never serve as supports for clasps. It is absolutely necessary that the adaptation of the clasp to the tooth and plate shall be as accurate as possible; if a clasp, on account of a faulty adaptation, changes the position of the tooth in the alveolus, an inflammation of the alveolo-dental periosteum, with resorption of the alveolus, will take place, causing as a final result the falling out of the tooth. If the clasp encircles the tooth too tightly pain and loosening of the tooth will accrue. With regard to the *making* of clasps, Harris said that he believed that he could prove that one-half of the dentists did not know how to make clasps, and that two-thirds of the other half were incapable of recognizing their defects.

The making and conditions of adaptation of clasps. The metals used for the manufacture of clasps are gold, platinum, or an alloy whose composition varies according to the nature of the metal used in the construction of the plate. The metal of preference is platinized gold. This gold must be twice or three times as thick as the material used for the plate, and wide enough to adapt itself to the cylindrical portion of the crown of the tooth. Clasps made in this way are known as flat clasps. Half-round wire clasps are very little used, and are only indicated in exceptional cases, as when the teeth project very slightly beyond the gingival border. A very good plan consists in marking upon the plaster model the outlines of the clasp and then making a sheet-lead pattern. Some dentists make this pattern directly upon the plaster model that has been previously boiled in stearin; others, on the contrary, make it upon a zinc model of the tooth to be clasped. The pattern is to be flat-

tened upon the plate of metal used, and the clasp is then cut out. The clasp is now adapted to the tooth by means which vary according to the nature of the materials used for the plate. The use of round pliers is uncertain and insufficient; therefore, in some cases many practitioners advise us to adapt the clasp to a zinc model. When the contour of the tooth is very irregular the operation can be done in the following way: A very thin platinum band is adapted to the tooth by means of a burnisher, and little pieces of 18-k. gold are then placed upon it and soldered.

Fixation to the plate. It is an error to think that the solidity of clasps is in direct relation to the area of clasp soldered to the plate. The predominant quality of clasps must be elasticity. If they are soldered throughout their contact they form rigid attachments, which are detrimental to the teeth which support them. It is necessary that a certain relation should exist between the dimensions of the clasp and the extent of its attachment to the plate; this should never be of more than 5 mm. The point of attachment should preferably be at the mesio-palatal angle. The two arms of the clasp should be of the same length, except for short clasps where it is preferable to have all the elasticity upon a single arm. A single point of attachment is better than two, as it allows for the movements of the plate. In plates with clasps the plate should either come as near as possible to the necks of the teeth or else a sufficient space should be left between the natural organs and the plate, for if the space between the plate and the teeth is not sufficient the mucous membrane found in that space is liable to become inflamed as the result of being compressed against the teeth.

Different methods of making and of attaching clasps. Some of the methods refer entirely to the making of the clasps, as the method of Dr. Eagle, which permits of an adjustment as perfect as possible. He obtains this result by adjusting temporarily the clasp to the plate by means of wire. He solders the clasp to the plate only after repeated trials. The method of Dr. Cusham is in reality a modification of the previous one, and is serviceable when the adjustment is a difficult one, as, for instance, in very much inclined teeth. He solders to the clasp a little metallic band, which he bends until it touches the plate which is on the model. Both are put in the mouth, and then with a sharp instrument the point where the non-soldered extremity of the arch touches the plate is marked. It is put back in the model, the extremity of the arch is adjusted to the marked point, and is maintained there until soldered. Some practitioners use plaster to ascertain the exact position of the clasp and plate in the mouth. Others have tried to give the greatest amount of elasticity to the clasp. This quality can be highly increased by using certain means of adjusting the clasp to the plate, especially when this is a metal one. M. Pillete, in his lectures at the Ecole Dentaire, has insisted upon this point, and has indicated several means of obtaining great elasticity at the same time as great solidity. He described several classes of clasps; some independent of the plate and only joined to it by a bar; some attached by means of a transverse device composed of two parts superposed and

equally independent as to each other; again, clasps of the form of a cap, or clasps with the point of attachment removed from the plate. Dr. Spalding says that he has obtained the best results with thick and narrow clasps attached to the plate at a remote point.

Partial clasps or stays. Any retaining device which encircles less than two-thirds of the contour of a crown is a partial clasp or stay. These clasps differ from the preceding by the absence of elastic branches intended to grasp the tooth, as they are only supported against two sides and one angle. They are placed against the palatal surface of bicuspid, where no space exists for the passage of a clasp, but very often a thin bar is passed between the teeth, previously separated. In this connection it is well to insist upon the necessity of repolishing the surfaces that have been separated with the file. These stays are generally used in pairs,—one for the first bicuspid and one for the second. They give great stability to the piece, and are in fact very good retaining devices. These clasps are also used when the bicuspid and molars are wanting, and when the lingual side of the canines is such that a large clasp covering them entirely would interfere with the articulation and prevent the plate from remaining in position. They embrace the cervical half of the labial surface or exercise pressure like a pair of pliers against the mesial and distal surfaces of the tooth.

Before concluding the description of clasps we must mention the *half-round wire clasps*. On account of the restricted and exceptional indications for their use, they are not considered among the ordinary retaining devices. They are used only upon teeth whose crowns do not permit of the fitting of a flat clasp. They are very detrimental, inasmuch as they penetrate below the gum, detaching it and often causing severe periostitis.

The *spurs*, although they are not, properly speaking, retaining devices, are nevertheless valuable auxiliaries to clasps, preventing their penetrating into the mucous membrane and injuring it.

The clasps made of *plastic bases* are only made in conjunction with plastic pieces, and are generally placed upon the posterior teeth. Their action is not often effective, nevertheless sometimes they prevent the lateral movements of the plate when they are fitted against two molars on either side.

We have yet to examine some auxiliary means, such as pivots and also pegs made of wood or of hard rubber.

Pivots are composed of a metallic bar nearly always made of platinum, and intended to be fixed in the canal of a crownless tooth. As these pivots are used in connection with removable appliances, it is necessary to take certain precautions in order to prevent infection of the canal. The closing of the apical opening is not sufficient; it is necessary to isolate completely the root by means of a metallic tube which is adapted to the canal, and which is soldered to a cap which covers completely the free portion of the root. This method is sometimes combined with clasps, especially when only a few anterior roots and a few molars remain. This method of retention is only applicable when roots are present. With regard

to the wood or hard rubber *pegs*, they serve to assure temporary firmness to the appliance, and are in this connection of occasional usefulness; but are not devoid of disadvantages, on account of the abnormal pressure exercised against the tooth.

Spiral springs. This is probably the oldest retaining method used in prosthesis. The primitive appliances were fixed with either whalebone, steel, or gold springs. Later on Laforgue devised the gold wire spring coiled around the mandrel. Their use is very limited on account of the improvements realized in the operation of taking impressions and in the making of appliances. They are only used in special cases, such as when an appliance is to be used immediately after the extraction of several teeth, or in cases of pronounced maxillary resorption, or when the palate is so deformed that adherence is not possible. The use of springs necessitates the presence of two plates in the mouth. The springs are maintained by means of an arm which has a hook at one of its extremities; through this hook passes a screw with a rounded head, which is fixed to the appliance. The position at which the springs are attached to the plate is not indifferent; it must be placed as near as possible to the center of gravity of the plates, which for the upper plate is generally found between the first and second bicuspid, and for the lower plate in the prolongation of the perpendicular drawn from the center of gravity of the upper plate. They are hence found between the cheek and the external portion of the appliance. At this point there is a slot, so that the spring may cause the least possible irritation to the mucous membrane of the vestibule of the mouth. Often a shoulder is made in order to limit the movements of the springs. In the case of metal plates the arms are fixed before soldering the teeth. A more exact method consists in determining the position of the arms after the plates are completed.

Disadvantages. Springs are often liable to get out of order and to break. The mastication of certain foodstuffs becomes very difficult. They retain in the interstices of the spiral the secretions of the mouth, which they change and which become the cause of irritation. Very often their contact with the mucous membrane is the cause of very painful lacerations. Besides, the necessary manipulation of the plates for cleansing purposes becomes very difficult. Still, if they present disadvantages they also have some advantages. When they are of appropriate dimensions and well fixed they constitute a very sure retaining device. Their pressure upon the artificial pieces is constant, no matter whether the mouth is open or closed. They do not interfere with the movements of the jaw, and, although at the beginning they are annoying to wear, the patient eventually becomes perfectly tolerant of their presence. It is also well to mention that upper plates retained by springs do not need to cover the roof of the mouth,—a fact which is highly appreciated by people in whom the mucous membrane is very sensitive.

Atmospheric pressure as a physical mode of retention. Retention by means of a vacuum is based upon the principle that plane

surfaces which are perfectly placed one upon the other produce a vacuum between them, and will adhere to each other; the same phenomenon is produced if a drop of water is placed between the two surfaces, in which case the atmospheric pressure acting against both surfaces will permit them to be lifted together, as though they formed a single mass. In the same way is explained the adherence of a hollow key to the lip when we exhaust the air in it by inspiration. This principle is the one that has been applied for the retention of metallic or plastic bases.

Condition of adaptation. In order to obtain by this means a perfect adherence it is necessary to get an exact adjustment of the appliance; that is, that the teeth should be sufficiently long and the articulation as exact as possible, so that no movement of leverage should occur. The upper molars should be placed far enough from the median line to insure the line of pressure being outside of the alveolar border. The plate must, moreover, be supported upon the alveolar border rather than upon the palate. The making of the vacuum varies according to the nature of the base-plate, whether metallic or plastic. For the metallic variety a piece of tin of the shape of the air-chamber is cut out and placed upon the plaster model. When the molding and pouring are completed and the plate swaged, it will show a concavity. For the pieces made with plastic bases the air-chamber is placed at the desired position just before the rubber is packed, the packing being done immediately after this is in position. It is indispensable that the margins of the cavity should be well defined. Some practitioners use air-chambers in lower pieces. Some practitioners have recommended the use of air-chambers provided with valves,—a little round piece of rubber is fixed in the air-chamber; this, according to their opinion, increases the adherence. This is a procedure that is to be condemned as incompatible with the interests of the patient. It favors the shaking of the appliance in the mouth, acts as a cupping-glass, and often causes disturbances of the palatal mucous membrane.

Advantages and disadvantages. Is there any advantage in employing this method of retention? We do not believe so, except for cases which are, fortunately, very rare, when it is permitted to the practitioner to depart from all scientific rule in order to obtain immediate result. On the contrary, it is a very good thing that the successive improvements in the methods of adapting the plates to the mouth should have gradually diminished the number of cases in which the use of the air-chamber would be indicated. Air-chambers are largely responsible for detrimental changes similar to those brought about by the use of suction with valves. Who has not seen the inflammation, sometimes very extensive, of the roof of the mouth consequent on their action? In the cases where it does not become detrimental it becomes useless, inasmuch as the mucous membrane eventually fills up this cavity and its action is lost.

Adherence of contact. The application of this principle to artificial teeth has been in use for a long time. The plates used in

former times were made of ivory; on this account it was very difficult to accurately adapt the plate against the palate in order to avoid the entrance of atmospheric air. It remained fixed in the mouth only when the mucous membrane was soft enough to adapt itself to the plate. Although these pieces occupy more space than those that are supported by springs, it is not necessary to exaggerate their dimensions. In the making of such pieces it is important to cut a groove in the posterior border of the plate. The size of this groove may vary according to the sensitivity of the patient.

Partial plates can also be benefited by this adherence of contact, but in this kind of pieces there are two causes of instability which prevent them from having the stability of full plates or of partial plates with clasps. These are the lateral movements and the limited extent covered by the plate.

Retentive appliances without plates. By appliances without plates we mean artificial crowns and bridge-work, which is an assemblage of several crowns. We will divide this section into immovable pieces and the methods of retention used, and removable pieces and the methods of fixation.

Artificial crowns. These pieces are of very ancient origin. The first variety was made of natural crowns united to the root by means of wood pivots. The swelling of the wood through the humidity present took the place of fixing material. Metallic crowns were known at the beginning of the present century.

Classification. Artificial crowns can be divided into two principal varieties. The first comprises all the crowns which depend for fixation upon a post anchored in the root-canal. The second comprises those which are supported by a circular band encircling the neck of the root. The pivot crowns are subdivided into two groups,—one in which the pivot forms an integral part of the crown, no matter if it was fixed to the crown during its manufacture or later on by soldering. The other group comprises crowns that are fixed to a pivot previously secured in the root-canal. Lastly we could mention a third variety, the collar and post crowns, where the collar protects the root against fracture and disorganization.

Conditions of application. These varieties of crowns are used according to the anatomical, physiological, and pathological conditions of the root. From an anatomical standpoint we must first consider the position of the tooth, whether it be incisor, canine, bicuspid, or molar; next its relative position in relation to its neighbors and its antagonists, and then the resistance and solidity. For instance, in the case of a central incisor a rigid pivot is necessary in order to avoid the tendency of the articulation to throw them outward.

The form of the teeth. This is a factor of great importance, and should be duly considered. It comprises the form and dimension of the root to be crowned. In fact, if we take two roots of the same length and diameter, if the crown of one is larger than the other the force of the articulation will be greater in this tooth, as the

mechanical force exercised against the root increases in proportion to the extent of its articulation. In the same way, if we take two roots of the same length and of different sectional surface, and into them insert two crowns of equal size, it is natural that the resistance offered by the smaller root will be less than that offered by the larger one.

Physiological and pathological considerations. It happens sometimes when we have to replace a crown that the pulp has not been affected. If such is the case, are we authorized to destroy it? Where the pivot is not indicated it is not necessary to devitalize the pulp. The condition of the periosteum is also of great importance, for a root whose periosteum is inflamed cannot be crowned. It is an absolute rule that a root that is to be crowned must have its canal perfectly aseptic and its periosteum in a healthy condition.

We cannot go here into the details of the therapeutic preparation of the root, notwithstanding its capital importance. We will just say a few words about its mechanical preparation. This operation consists of two parts: First, the reduction of the volume of the root for the accurate adaptation of the crown; and, second, the restoration of decayed roots. The reduction of volume consists in giving to the root a regular form. The restoration of roots is of importance with regard to retention; this is aided by the band which surrounds the root. The method of retaining partial crowns is slightly different from the methods employed in the case of permanent crowns. In the case of incisors, when the fracture is a transverse one, and when it is removed from the pulp, the porcelain block is fixed by means of small pivots which are cemented into little holes in the crown of the tooth. When the partial crown is intended for the substitution of a portion of a molar it is always made of metal, and is fixed by means of hooks. This method is sometimes used in connection with incisors. The pivot must always be made of metal, and must be flattened in order to increase its resistance; nevertheless, when two pivots are inserted in a single tooth,—in a bicuspid, for instance,—they may be either square or round. Before adjusting the pivot two-thirds of the length of the canal must be enlarged in order that the pivot should enter with ease. The anterior portion of the root is ground below the gum-margin. For the mutual adjustment of crown and pivot an impression may be taken. After the two have been adjusted in the laboratory, the necessary operations for the finishing of the crown are made, and when finished it is cemented to the root.

Metallic crowns. We will only study the band, as it is the only mode of retention. The indispensable conditions are (1) a perfect adaptation of the band to the neck of the root; (2) that these bands should not irritate the surrounding tissues, and (3) that they should serve for the protection of the tissues which they are covering. It is necessary to file the contour of the root in order that its walls should be perfectly parallel. The size of the root can be taken by means of a wire or of a band, such as that devised by Dr. Herbst. When the band is made according to this measure it is tried; it must

fit perfectly the contour of the root. The removable crowns are fixed to the roots by means of pivots, but, instead of being sealed in the pulp-canal, they are fixed within a tube sealed in the canal. In order to obtain a greater solidity the extremity of the pivot is slit, and the segments are separated very slightly in such a way that the pressure which they exercise against the walls of the tube keeps the crown in a solid position. As a general rule the crown is surrounded by a cap, which increases the solidity of the root. It is the only practical system employed for porcelain crowns.

Methods of retaining bridge-work. In this connection M. Lemerle, in his historical work on "Dental Art," has shown us that four hundred and fifty years ago missing teeth were replaced by artificial ones. The Museum of Corneto possesses very ancient prosthetic appliances where the artificial teeth were joined to the natural ones by means of a very soft and thin gold bar. Gold wires and the contiguous teeth were generally used as retaining media. The wires were then substituted by bands, which for centuries were the only retaining media used. Later on teeth were carved out of hippopotamus ivory, and were far from having the appearance of the natural organs; they were retained by means of gold wires, silk thread, or bands. Then came the whalebone, steel, and gold springs and the bar appliance as a device for the substitution of teeth of the inferior maxilla. Gariot and Delabarre devised the real bar appliance known to-day as bridge-work. From that time this kind of work became general, but it was followed by very bad results, for the roots used were not always thoroughly disinfected.

Classification. The following is a logical classification: 1. The methods of retaining immovable fixtures. 2. The methods of retaining removable fixtures. *Immovable* bridge-work is an appliance provided with certain means of retention which are sealed to teeth or roots, and which exercise the functions of supports. *Removable* bridge-work is an appliance constructed in such a way that the media of retention only adapt themselves to fixed supports, and it can be removed as a simple appliance whenever the case demands.

Means of retaining immovable bridges. For this purpose are used crowns, collars, pivots, and bars. The bars are metallic ones, soldered to the bridge-work and projecting beyond it sometimes only on one side, sometimes on both. These bars are fixed into cavities made in the natural teeth or into metallic crowns. When they are fixed in cavities in healthy or decayed teeth a great sacrifice of tooth-substance must be made. This is one of the many disadvantages of this retaining method. The form of these bars varies considerably. In a pulpless tooth the bar can be curved and inserted in the canal or in a perforation in the palatal surface of two teeth, or by means of a strong bar which unites two teeth and which serve as articulating surface to the antagonistic teeth, as is the case in the device of Dr. Ruy. The advantage of bars is to give more solidity to a very extended bridge; besides, in bridges of one or two teeth, and where the teeth are decayed, it prevents the use of visible

appliances. The use of bars is not especially disadvantageous, for all the devices used for the retention of immovable bridges present many inconveniences; the rigidity of the appliance is detrimental to the supporting teeth.

Methods of retaining removable bridges. The essential point to be considered in the methods of retaining removable bridges is the absolute protection of the teeth and roots against the organic *débris* found in the mouth. It is better to use the most simple devices. The methods employed consist of telescoping crowns; of pivots adapted to tubes sealed in the root-canals; of caps, and even of screws.

II. *Methods Used in Orthopedic Prosthesis.*

These do not differ very much from the methods already described. Clasps, bands, and crowns constitute the mechanical means of retention, while the adherence of contact is the physical method. Appliances of the orthopedic variety can be divided into two groups,—the immovable and the removable appliances. We will study the retaining devices of the first group and the modes of fixation of the second.

Conditions of application. The modes of retention in orthopedic appliances must possess the following qualities: *Simplicity*, in order not to increase the volume of the appliance, and in consequence avoid annoyance to the patient. *Cleanliness*; the facility with which appliances of this kind can be cleaned is of great advantage; they should be constructed in such a way that no food *débris* may be retained. *Efficiency* is indispensable, as the acting forces are without effect if they are not accompanied by reliability in the appliance. Lastly, they must be *inoffensive*. By this we mean that the construction of the clasps, bands, and crowns should not exercise a harmful influence upon the crown of the tooth or upon the mucous membrane.

Methods of retaining by plates and removable appliances. For this variety of appliances a plate covering a more or less extended portion of the roof of the mouth is used. This is the point of support from which the different forces act. It can be made of metal, of platinum in preference, or else of plastic substances, such as vulcanized rubber. M. Martinier says that the metal appliances are easier to cleanse, and are not permeated by the buccal fluids, as they do not possess the permeability of vulcanite. They irritate less the mucous membrane which supports them. They are less annoying to the patient, as they are less voluminous and are more easily concealed; but they possess the inconvenience of requiring clasps and metallic wires for their retention, and these may be detrimental to the teeth. Vulcanized rubber is the plastic substance which is used to greatest advantage in orthopedic appliances, on account of its adaptation to the soft and hard parts of the mouth,—its exact adherence, which permits of its being retained in the mouth without any other means of retention. Besides, it is useful in cases where piano wire has to be used, as this cannot be soldered. The modes of retention used in connection with vulcanite appli-

ances can be simple or complex. They consist simply of a plate which is more or less extended, according to the irregularity, and which covers a certain number of teeth. We find examples of these appliances in those of Coffin, Francis Jean, Martinier (first model), Barbe, and Kingsley. They are complex when other means of retention are added to the plate (as a general rule, of metallic nature), such as bars, wings, or by attaching a half-round wire clasp at the posterior part of the plate, to be supported at the external surface of molars, leaving the masticating surface free, and hence avoiding a change in the articulation,—such as the appliances of Guilford, Kingsley, and Jackson; or else by means of a bar upon the external surface of the anterior teeth, the extremities being imbedded in the rubber.

The metallic appliances are retained by the adherence of contact, and by means of clasps. The kind of clasps best adapted and mostly indicated, on account of its strength and safety, is the plier-clasp of Martinier (second model), whose elasticity assures a firmness to the appliance which is really remarkable, and, as it does not go through the approximal spaces, there is nothing to cause disintegration of the enamel or caries. They are applied principally to the molars, and sometimes to bicuspid. The other methods are the same as those that we have enumerated for the plastic appliances retained by combined methods.

Methods of retention without plates: Immovable appliances. These appliances have the advantage of not covering the roof of the mouth; they are not voluminous, are only slightly visible, and do not cause any annoyance to the patient. They are very effective on account of the rigidity of their retention.

Bands. The origin of this method is very obscure. It seems to have been devised by several practitioners at the same time. Goddard believes that it was first used in 1863, but what we know for sure is that the generalization of this principle and its application to dental orthopedia is due to Magill. The Magill band consists of a gold or platinum band of a thickness corresponding to No. 4 of the French gauge, and of 4 mm. in width. Then there is Dr. Angle's method of making these bands. The acting forces, such as rubber bands and metallic bars, are applied to these bands (appliances of Angle and Jackson), jack-screws, threaded tubes (Goddard), and hooks to serve as support for rubber bands (Guilford). They can also serve as supports to springs in extending appliances. The bands are cemented to the teeth. Before applying the cement the tooth should be covered with a resinous substance in order to avoid the chemical action of the cement upon the enamel. The applications of these bands are very numerous. Angle has used them in his appliances for the correction of prognathism; Case for the rotation of teeth; Goddard in different appliances for elongation and correction of abnormalities of position. Guilford and Talbot have also used the same means.

Collars are bands whose extremities, instead of being soldered, are united by a screw and nut, which, when tightened, grasps the tooth tightly. A collar has the advantage of being removed from

the tooth with greater facility than the other variety of bands. Two or three teeth can be grasped by the same band, as in Farrar's drawing appliance. At both extremities of this ribbon two tubes, threaded on the inside, are soldered. Through these tubes passes a screw which has two nuts; these are tightened or loosened, according to the requirements of the case.

Collar crowns. These are metallic crowns made of gold plate of from 18 to 22 k., having the outlines of the natural tooth. They are placed upon crowns and roots. They serve as retaining media, and to raise the articulation. They can be placed upon all the teeth, and sometimes they cover only the incisive edge or the masticating surface of a tooth. In such cases they are called capsules. They can be used in certain cases where the bite has to be opened to favor the elongation of the first and second molars in cases of marked anteversion of the anterior upper teeth. To these crowns bars, bands, clasps, tubes, screws, and nuts can be attached, according to the irregularity to be corrected. The making of these crowns is a rapid operation. An impression of the tooth is taken with moldine; in this a metallic model is poured, and a counter-die is then made. For a canine a circular piece of gold is taken. The radius of the circular piece should be equal to the height of the tooth. A V-shaped space is cut out, and a conical form is given to the piece; the crown can then be swaged with greater facility. The molars are made in a different way. The plate of gold to be swaged is given the shape of a maltese cross. The central portion must be as large as the masticating surface, and each arm slightly larger than the sides of the tooth.

Gaillard's appliance. This is the best-known appliance in France. Its simplicity and the very small amount of annoyance which it causes to the patient makes it a very valuable appliance. It is composed of two or several metallic crowns, to be placed upon the bicuspid and molars, and which cover the external and internal gingival borders for a distance of a few millimeters. These crowns have flat tops when the bite has to be opened, or have the masticating portion cut out if the bite has not to be opened. This appliance is retained by means of silver wire ligatures passed through the triangular spaces between the molars. This is what constitutes one of the modes of retention of the appliance. In appliances for the elongation or reduction of teeth this variety of crowns and capsules is used as means of fixation.

Lastly, in orthopedic prosthesis we have at our disposal another method of retention. We refer to the extra-buccal devices used in connection with certain appliances for the correction of prognathism. An American author has made much use of this device, and has obtained most satisfactory results. The Angle appliance is composed of a head-piece, and offers great force and firmness.

With regard to the methods of retention of the appliances for firmly maintaining apposition, I will say that the devices employed are the same as for the active appliances, with the single difference that they do not serve as supports for acting forces.

Discussion.

The PRESIDENT. I would like to call your attention to the fact that the paper that has just been read is on a subject that was not selected by the essayist, but one that was assigned to him by the committee of organization of Section V; hence he has had to discuss a question not selected by himself and to write a paper on a difficult subject. You will see that our *confrère's* communication is a very careful one, and we must thank him for his earnestness in treating such a sterile question.

Dr. MICHAELS. I agree with your observations.

Discussion closed.

(To be continued.)

PENNSYLVANIA STATE DENTAL SOCIETY.

(Continued from page 423.)

SECOND DAY—FRIDAY, JULY 6, 1900.

Afternoon Session (continued).

AFTER the transaction of routine business, and the presentation of the report of the committee upon the president's address and its several recommendations had been disposed of, a paper, entitled "The Relation of the Pulp to the Apical Region," was read by Dr. S. B. LUCKIE, of Chester, Pa.*

Discussion.

Dr. JOSEPH HEAD. I have had great pleasure in listening to the able paper by Dr. Luckie, and it suggests so many points for discussion that I fear I shall be unable to do the essayist justice in my discussion.

However, one or two points have struck me as being especially important, particularly that concerning nostrums. I think we as dentists are apt to accept and use medicines or formulas of which we are ignorant. I believe it would be a good plan and a great benefit if each one of us should promise himself that from to-day he would never use anything he did not understand,—never use any medicine the composition of which he was not acquainted with,—in order not to jeopardize his patients by the possible harmful use of unknown preparations.

And this leads me also to the question of dental ethics. There are some who come to dental conventions and listen to the results of researches and all the thoughts and ideas that have been given forth, taking advantage of everything presented, and yet because they think they have something that is of especial value they will not tell us, but keep it to themselves. That, in my opinion, is avowed quackery, for what else is quackery but the keeping of personal knowledge for personal gain? Therefore I think that any

*Dr. Luckie's paper appears at page 238, March issue of the DENTAL COSMOS.

member who comes and presents a nostrum or offers for sale a formula for his own personal gain, keeping back that knowledge from his fellow-practitioners, should be debarred from membership in a professional gathering and be relegated to his fellows.

Another point raised by the essayist seems to me to be important; it is the question of how we should treat pulpless teeth. For some time it has been my custom, to the best of my ability, to remove all of the pulp I could and fill the rest of the canal with antiseptics and trust in divine providence, and I think perhaps the rest of us have pursued the same methods.

When, about two years ago, the question of pulp-mummification was brought forward I laughed at the idea as being preposterous in the extreme, and I found that most of my friends laughed at it; but I met Dr. Darby one day, who reported some pretty good results from it, and I met three or four others who told me the same thing. Just about that time I suffered from a congested pulp, which furnished opportunity for a personal experiment, and I must say I was delightfully surprised. While I had a dull sort of toothache for one or two days, the disturbance passed by, and for the last nine months the tooth has given me absolutely no trouble. As a result I came to the conclusion that if the tooth is made perfectly sterile before we place our mummifying paste in the pulp-chamber, that renders it so tough and hard as to be unpalatable to the germs that may afterward come in contact with it. If the pulp will dry up and become aseptic, I cannot help thinking that this much-decried method of pulp-mummification may perhaps, in time, prove to be one of the greatest boons that has come to us in the last five years.

Dr. REGISTER. I wish to call attention to the importance of the point raised by the essayist in relation to applications of arsenic to the pulp in their relation to apical irritation. This is especially important in connection with the treatment of the deciduous teeth. We have all noticed that under normal physiological conditions the pulps of the deciduous teeth seem to remain active until the entire tooth, with the exception of the cap enamel, is absorbed and the latter is ready to tumble out. If the deciduous pulp is destroyed the physiological process of absorption ceases, and to a certain extent the root becomes a foreign body.

I am glad to be able to report that in a number of cases where I have capped pulps after absolute exposure they have become sealed over later by secondary formation of dentin, and the pulps have resumed their normal condition in every respect. Dr. Louis Jack has reported a number of cases of this kind, and I accidentally stumbled upon two of these cases that I had capped six years previously, and they were in perfectly vital condition. This secondary dentin deposit covering the pulp-exposure is absolutely void of sensation. My method of capping was with zinc oxid and carbolic acid. I think in all absolute exposures of the pulp we should be careful to use something soft in contact with it. As a preliminary treatment I know of nothing better than application of silver nitrate just before applying the cap. It has been thought that silver

nitrate, on account of its strong affinity for albuminous matter, will destroy the pulp, but it will not. I have never been able to destroy a pulp by the application of silver nitrate, and I have used it as high as seventy-five per cent. My usual method after the preparatory process of cavity preparation is to thoroughly wash with alcohol and to follow with a thin paste of zinc oxid with carbolic acid, which is carefully flowed over the exposed point and allowed to dry. Over this I flow the zinc phosphate, being very careful to make no pressure, as the pulp will not tolerate the most minute pressure upon it. If we avoid pressure and pathogenic germs, there is no reason why pulps should not be treated conservatively with entire success.

With regard to pulpless teeth, a number of years ago they were stumblingblocks to me, as I came in contact with many cases of root-disturbance as a result of infection, and I made up my mind that sterilization of the root was an essential prerequisite to save pulpless teeth. I experimented largely with compressed air, using large volumes of it for the purpose of removing all the liquid contents of the tooth and throughout the territory of the dentin as fully as possible, following this with the application of an antiseptic liquid for the purpose of excluding germs. When this treatment is carried out faithfully the apex may be sealed with the assurance that the filling will be permanently satisfactory. I have seen a pulpless tooth treated thirty years ago by Dr. Franklin Dixon, of Philadelphia, a tooth which I have had under observation for a number of years, and it has never to my knowledge given the slightest trouble. I cite the case to show the longevity of the pulpless teeth which have had the benefit of thorough and intelligent treatment. If for good and sufficient reasons it becomes impracticable to remove all of the pulp, it can be placed in the same satisfactory condition by application of the same principle which is involved in the treatment referred to by Dr. Head; although my confidence in the future of a tooth with a mummified pulp is by no means as strong as it is in that of a tooth in which the canal has been thoroughly and antiseptically filled, for the reason that in case of after leakage, which might possibly occur, infection would take place and the canal would be in the septic condition which we wish to avoid.

The subject was, on motion, passed.

Evening Session.

The evening session was devoted to a lantern exhibition by Dr. Cryer, the subject being "Some Variations in the Anatomy of the Facial Region."

There being no discussion, the meeting adjourned to the banquet-hall, and the balance of the evening was devoted to the repast, which was followed by addresses by a number of the officers and members of the association and their guests, among whom were Major-General Gregg, U. S. A., Judge Bland, Rev. A. G. Rogers, and others.

THIRD DAY—SATURDAY, JULY 7, 1900.

Morning Session.

The following paper by Dr. C. V. KRATZER was read by the essayist:

DENTAL DISPENSARIES.

I am prompted to write upon this subject by the existence of certain conditions which, in the light of nineteenth century advancement, seem almost if not quite alarming. These conditions can in the main be considered under two heads. In fact, they are dual conditions.

The first of these is one which is as general as it is fixed and irremediable. From the time of our first parents' expulsion from the garden of plenty, in all ages and in all lands there has been an unequal distribution of personal possessions; and it is perhaps fair to assume that in all future time, or at least until the realization of some Bellamy's Utopia, we will have the poor with us.

Poverty, therefore, is the main condition which leads me,—and as a matter of course prompts the establishment of all charitable institutions. Medical dispensaries and hospitals are quite common, and why not dental? Dentistry is now generally recognized as a specialty of medicine, but where at any of these institutions are dental lesions treated in even the most temporary manner? Nor could they be, in the absence of one with the distinctive training of our special calling. Nor, for the same reason, could these general institutions minister to serious involvement of any other of the human organs for the proper care of which specialties exist. Many of these have their special dispensaries and hospitals. Are the teeth, mouth, and jaws of less importance in the human economy than the nose, throat, ears, or eyes? Certainly their proper conservation is as conducive to comfort and longevity as that of any of these. But it is not necessary to measure dentistry by its comparative importance with other specialties to show the need of some system by which the poor can have their dental organs repaired free of charge, or, at most, by the payment of fees sufficient only to recover the cost of materials used. Convincing evidence presents itself to us almost daily, in and out of our offices, of the independent and distinctive need of this.

The other or second condition referred to is largely dependent on the first, as it has reference to the unprofessional, degrading, and criminal practice of extracting teeth and inserting artificial substitutes for the sole reason, real or fancied, that certain patients are unable to pay for the services indicated,—viz, the proper conservation, by filling and otherwise, of the organs involved. It is unnecessary to cite specific cases illustrating this, as we are all familiar with them, but it is distressing to the mind of the conscientious practitioner to be compelled to withhold the services indicated because of the subject's poverty. We may feel that we are doing all we can in the right direction when we expostulate and endeavor to reason with poor and ignorant patients upon the importance of preserving their teeth, but there is no true professional justification in this

when we accede to their demands afterward; or when we refuse to go counter to our judgment and then remain satisfied, knowing that from our offices they will go to a "parlor" or an "association," or even to another office, and get just what they ask for.

Of course this does not apply alone to that class of patients who cannot afford to pay for proper services, for many patients, especially ignorant country patients, pupils of that retrograde school, the wayside advertisement, whose means are not lacking, still cling to the unprogressive notion that so-called "false teeth" are the proper thing because they never ache, and because fillings don't last, anyway. God forbid that any of us should fall short of our duty as educators of these benighted creatures! Some will, of course, fall by the wayside, as must needs be the case so long as the laws shall permit ignorant and vicious men—aye, even thieves—to disgrace an honorable profession. But if we do our duty they will not all turn a deaf ear to our protestations. I hope to see the day when the laws will define it a crime to extract a tooth which could and should have been saved. Until that day comes we cannot compel those who are able to pay to accept our conscientious service. The very poor, however, are not in a position to demand specific services. They cannot say, "I pays my money and I takes my choice." Therefore the charlatan does not bother them. They invariably wait until, racked with pain, with or without the regulation fee they are driven somewhere for relief in extraction. Under existing circumstances the poor creatures can do no better, and generally we can do no better for them. But why should the conditions not be changed so that proper treatment can be given them?

It might be suggested that an occasional needy subject be treated free of charge by us in our offices, or that the charge for necessary and conscientious service be adapted to the patient's means. That is to say, when a poor patient presents for the extraction of one or more teeth which upon examination—with perhaps others in addition, as is not unfrequently the case—are found salvageable and important to the patient's welfare, instead of acceding to the patient's wish for extraction—because that is the cheapest, and therefore the only service they can pay for, if at all—or sending them away unserved, we pursue the course of treatment indicated and advised by us, and accept such fee as the patient can afford, or nothing at all, as the case may be.

But there are objections to such practice which seem to outweigh the argument that, inasmuch as we would be expected to donate our services at a dispensary, we might as well operate without charge at our own chairs. In the first place, persons receiving these gratuities at our hands would necessarily feel grateful, at least some of them would. Their gratitude would take the form of recommending us to their friends of like fortune, so that we would soon gain a reputation for charitableness which, besides making impossible demands upon our time, would be most annoying in bringing to our offices an undesirable class—I refer now to the very poor who are ignorant and untidy—which would work harm to us in repelling good-paying and fastidious patrons. In the second

place, it would be unsystematic and partial, and those who were denied our free services upon application would have just cause for complaint.

The only just and equitable way would be to have institutions where the poor might feel free to apply, under proper restrictions of course, for dental services, where they would be invited to come and have the principle of "a stitch in time saves nine" applied to their dental organs, and where they might be compelled to bring or send their children from, say, the age of three years and upward. Such coercion would contemplate the necessity of special legislative enactment, which is not at all impracticable, but, on the contrary, quite in line with existing laws for the protection of life and limb, for the maintenance of the public health by the employment of the various known means for the prevention of the spread of contagion, etc. Children might be compelled as a requisite to admission to our public schools to show a certificate from a dentist as to the condition of their teeth, but without a system of free services the very poor could not comply with such a regulation. Many institutions of learning now require this from all applicants for matriculation. No recruit is admitted to the army or navy of our government whose teeth are not in at least a fair condition. Perhaps if we had long ago begun with school children such regulations for adults would not now be necessary.

Now, as to specific lines upon which this structure is to be established I have no definite idea. Let us once thoroughly realize the importance of the subject and plans and means will follow. But in a general way the scheme followed by other specialty dispensaries might be adopted. A room would have to be fitted up with necessary fixtures and appliances, a schedule of operating days be fixed, and an equitable distribution of time donations could be made by practitioners. That would be one way. Another and a better way would be the establishment of dental departments or wards in medical and surgical hospitals and other charitable institutions, together with a resident dentist and visiting staff, the whole to be maintained from the state and municipal appropriations and from private contributions to the general institutions; and this is the plan which would at least ultimately be adopted. If the bill now in Congress providing for the appointment of dentists in the army and navy should become a law, the prestige it would afford would aid materially any concerted effort toward the establishment of dental dispensaries as state or municipal dependencies, either as distinct institutions or as departments of existing ones.

In cities possessing dental colleges there is perhaps no need for special provisions in this line, as the college clinics and practical operations of the students afford ample means for the poor to receive proper, if not always the most skillful, services. But as the large majority of cities are not favored with dental colleges, and, so far as I know,—not having made a study of data on the subject,—none having such dispensaries as are herein proposed, there is a vast opportunity open to us for conferring great good upon our unfortunate fellow-men which may be far-reaching in its effects.

And in this age of altruism this field should not long remain barren and unfruitful.

That abuses would be met with in dispensing free dentistry goes without saying. The medical profession in certain cities has been much disturbed over the facts brought to light that many unscrupulous well-to-do persons have been regularly taking advantage of the opportunity afforded by charity dispensaries for free services and medicine. But it does not seem to me that this is a good argument against the system. Much good is undoubtedly done the poor by existing free dispensaries, and we as dentists might profit by the experience of those concerned with existing institutions in establishing safeguards that would, if not wholly prevent abuses and impositions, at least serve to keep them at a minimum. Most of us are to some extent imposed upon in our private practices, so that we are at least not entirely unused to it, and we ought to be willing to suffer a little in laboring for humanity's good. This we undoubtedly do now, but here is a new phase in which our unselfishness may be manifested.

A discussion which ensued upon the reading of Dr. Kratzer's paper dealt with the propriety of publishing the essay in the daily papers, and not with the topic, and it is therefore not here reproduced.

The society next went into the election of officers, who were duly installed, and, after listening to the reading and approval of the minutes of the morning session, the meeting finally adjourned.

NORTHEASTERN DENTAL ASSOCIATION.

THE annual convention of the Northeastern Dental Association was held at Providence, R. I., October 16, 17, and 18, 1900. The meeting was called to order by the president, Dr. Waldo E. Boardman, of Boston. The reports of the several officers were read and accepted, after which the president read his annual address; the vice-president, Dr. A. J. Flannigan, presiding.

The president's address dealt with the developments which had characterized the progress of the nineteenth century in art, religion, and science, and the increased intelligence and prosperity of the nation as a result of this progress.

PRESIDENT'S ADDRESS.

The beginnings of the Northeastern Association were traced back to the organization of the Merrimac Valley Dental Association in Lowell, Mass., thirty-seven years previous, that association in 1882 becoming the New England Dental Society. One month after the formation of the Merrimac Valley Association—viz, in November, 1863—the Connecticut Valley Dental Society was organized, both of the organizations continuing until 1895, when they were consolidated as the present association, covering the New England states.

"To-day we celebrate the sixth annual meeting of the consolidated

associations, one of the largest in its history, and I venture to hope that at no distant day this association will become a section of the National Dental Association.

"I desire to congratulate the examining boards of New England in bringing about the permissive act of interchange of certificates upon the payment of the license fees demanded by their respective states.

"This is the entering wedge for like effort throughout the Union, and will promote better feeling and goodwill toward all in the practice of our profession. I would recommend that this association take favorable action relative to the prosecution of illegal practitioners in the several states which it covers, either by conference or otherwise between the different state societies of New England and their respective boards of examiners.

"I would also recommend that this association apply to and become a section of the National Dental Association,—for which purpose, among others, it was, I understand, created.

"I recommend that the date of the annual meeting of this association be changed from the third Wednesday in October to the last Wednesday in the month of June.

"I commend the suggestion of our editor in his fifth annual report, wherein he recommends this body's taking action relative to urging each state society forming responsible committees to take charge of the preparation of the local history of their respective states, in co-operation with the national committee engaged in the preparation of a history of dentistry in the United States.

"I also recommend that a committee of six or more, at least one for each state, be appointed to urge their respective state societies as to choosing a committee for the purpose of watching for and keeping a record of original researches, new discoveries and inventions, or experiments in the science of dentistry, that they may be reported to a similar committee of the National Association for presentation before that body at its annual meetings.

"To accomplish good for this association and for ourselves individually, we should emulate those who have given of their time and thought for the inspiration of others, for if it were otherwise we could not progress in true professional spirit."

The address then made reference to the death of Drs. W. W. Bridge, of Providence, and A. E. Wales, of New Britain, Conn.

In closing, the president urged upon members of the association the importance of a full consideration and discussion of the essays which were to be presented before them as set forth in the official program.

The president then introduced Dr. FREDERICK BRADLEY, of Newport, R. I., who read the following paper:

THE IDEAL IN DENTISTRY.

After sending the title of my paper to your committee it occurred to me that possibly it would not indicate exactly what I wanted to say, but on looking up the definition of "ideal" in the Century and other dictionaries I found sufficient justification for so using it.

Sometimes we think of the ideal as existing only in the imagina-

tion or fancy, as being visionary and practically unattainable, yet I desire to use it at this time as meaning that which we conceive as perfect, supremely excellent, or very desirable. There is a term which might possibly please me better,—viz, "Ideality." It is used by phrenologists to express certain qualities of the mind, and I will give you a definition of the term as set forth in a handbook of phrenology: "Ideality is the perception and admiration of the beautiful and perfect; good taste and refinement; purity of feeling; sense of propriety, elegance and gentility; polish and imagination adapted to the beautiful in nature and art. Perverted, it gives fastidiousness and extra-niceness."

Whether we accept the teachings of phrenology or not, I believe we shall all agree that the qualities of mind as given in the definition of Ideality should pre-eminently characterize the dentist of to-day.

An old Persian maxim said, "Aim your arrows at the sun," and no doubt many may and some will say that one is quite as likely to hit the sun with his arrow as to satisfy fully his desire for the ideal in all the phases of life. But I maintain that only by a cultivation of the good, the true, and the beautiful can we expect to get out of life and of our profession any real satisfaction.

What hope is there for that man or dentist who talks of his treadmill existence and bemoans the necessity of drudgery? Some one has given us a new beatitude as follows: "Blessed be drudgery, for it may develop character." Of course drudgery in itself is not blessed, but as a discipline, as a means to an end, it may be the instrument of great blessing.

The striving for perfection, or the ideal, is apt to be considered by the ordinary man as if applied only to the fastidious or esthetic. People hear the Gospel appeal read in church frequently, "Be ye therefore perfect, even as your Father which is in heaven is perfect," and imagine it has sole reference to religious purity and sanctity beyond their reach. But we are justified in saying that it refers to the motive which should inspire every work we undertake:

"A servant with this clause
Makes drudgery divine;
Who sweeps a room, as to Thy laws,
Makes that and the action fine."

George Eliot brings out this idea in the character of Adam Bede, who made it his religion to see that all his work as a carpenter approached perfection as nearly as his skill enabled him to make it so approach. Every vocation or profession is susceptible to the influence of the ideal, and if one is simply plodding along without this inspiration,—is satisfied with low results or a perfunctory performance,—then the occupation drags down and degrades the man or woman engaged in it.

Lowell says, "Not failure, but low aim is criminal." This is quite in harmony with the Persian maxim I quoted above, and shows that an earnest, honest striving for the best, even if not accomplishing all one could wish, is not to be condemned. The very effort that discipline or drudgery involves will have left its imprint on the character.

I shall now take for granted that you will agree with me as to the desirability of the dentist's having a love for the ideal, or, as I prefer to express it, that he should develop the faculty of ideality; and the question arises, How is this task to be accomplished? I quote again from the handbook on phrenology, as follows: "To cultivate the faculty of ideality—First, avoid all disgusting habits, swearing, chewing, and drinking; low conversation; vulgar expressions and associates; dress and appear in good taste, cultivate personal neatness, good behavior, refinement and style in manners, purity in feeling, the poetical and sentimental; an elegant and classical style of conversation; in short, the beautiful and perfect in nature in general, and yourself in particular."

Again, I am satisfied you will agree with me that we have indicated very fairly, yet justly, what a dentist should avoid and what he should cultivate in his aspirations after the ideal; but before changing from generalization to particulars let me give one more definition of the ideal: "It is the endeavor to attain perfection by improving and uniting in one form all the best qualities to be found in different individual forms." If I understand this definition aright, then we as dentists should observe carefully and note the good points we see in our fellow-practitioners and adopt them for ourselves.

And now for a bill of particulars.

First, the reception-room of the dentist should be attractive, cool in summer and warm in winter, always well ventilated, and not suggestive of a surgery or a drug store; the furnishing should be in good taste,—not necessarily luxurious, neither should it have an appearance of bareness. Good literature in a limited quantity, either standard works or something new, or both. The broadly comic papers I should hardly have a place for.

Pictures in good taste can be had very reasonably now, and a few well-selected etchings or photographs add much to the appearance of the room. While everything should be scrupulously clean and neat, it should not repel by its primness, but attract by its brightness.

In the operating-room light, good air, and neatness should be characteristics. While every one must judge for himself as to the mechanical appliances that he needs, I think myself that everything should be as unobtrusive as possible. This may be difficult of accomplishment, for with the introduction of electrical appliances as adjuncts of the operating-room the trend or tendency is toward a multiplicity of equipment which may be discouraging or disconcerting to a nervous patient. An abundance of both hot and cold water I consider indispensable.

The instruments for the engine or the hand instruments should all be thoroughly cleaned each time after using. As to the proper method of sterilizing, I leave it to others, only insisting that everything shall be right; the napery fresh and clean, while in some cases, such as cleansing or the treatment of an abscess, I might use the unfinished or unhemmed napkins and then burn them. Ordinarily I prefer bird's-eye linen neatly hemmed and laundered.

The dentist himself should be a man worthy of the confidence of

his patients, whose presence is a guarantee of the pure moral atmosphere surrounding him. He cannot afford to allow his office to be a loafing-place for those who wish to retail stories or air their wit; neither should he make it a smoking-room for himself or any one else, either day or evening. If he smokes himself, let it be after hours.

In the services rendered to your patients so labor that your work shall not be a mere commercial transaction.

I remember hearing Phillips Brooks once say that he thought dentists were working on similar lines with himself; that is, we are to fit men for greater usefulness because of the perfection of our skill. What a noble vocation we may make ours! Infinite distances are open to him who will catch the divine message in the midst of his occupation. This was the thought of old Stradivarius, the violin-maker,—that since a divine power had put the strange harmony in the strings and cavities, he who so combined the conditions as to make the best instrument was in reality nothing less than a partner with the Infinite. It is no wonder that George Eliot, in her poem "Stradivarius," should exalt the man's dignified thought of his work. And with this quotation I will close my paper. She represents the faithful artist as saying—

"Who draws a line and satisfies his soul,
Making it crooked where it should be straight?
An idiot with an oyster-shell may draw
His lines upon the sand all wandering,
Fixing no point or pathway to a point;
An idiot, one remove, may choose his line,
Struggle and be content; but, God be praised!
Antonio Stradivarius has an eye
That winces at false work and loves the true,
With hand and arm which play upon the tool
As willingly as any singing bird
Sets him to sing his morning roundelay,
Because he likes to sing and likes the song."

His friend Naldo, however, says:

"'Tis a pretty kind of fame
At best that comes of making violins;
And saves no masses either. Thou wilt go
To purgatory, none the less."

But Stradivarius replies:

"'Twere purgatory here to make them ill;
And, for my fame—when any master holds
'Twixt chin and hand a violin of mine,
He will be glad that Stradivarius lived,
Made violins, and made them of the best.
The masters only know whose work is good;
They will choose mine; and while God gives them skill,
I give them instruments to play upon,
God choosing me to help Him."

Discussion.

Dr. RIDER, Danbury, Conn. The only criticism that we could make upon the paper is that it was not long enough nor explicit enough. I think there cannot be too much said on the subject.

We must take these suggestions and live up to them. If we should all live up to the rule laid down we would all of us be better, purer men, and I think that we would reach a larger measure of perfection and get far greater satisfaction out of our professional work than we do now.

Dr. MAXFIELD, Holyoke, Mass. The tendency of the age is toward commercialism. We hear very little of late years of the ideal in dentistry, but it is, "How much are we going to get?" for this or that. It is said that a corporation is being formed in New Jersey, with \$2,000,000 capital, to establish dental parlors throughout the country. Are we as a profession coming to this? Or are we going to follow such papers as we have just listened to? We should take this home to ourselves. There is a duty for each one of us to perform, and that is to elevate our profession, and I trust every one of us realizes that he can do his part in this direction.

Dr. D. M. CLAPP, Boston, Mass. I hail with delight such addresses as this we have listened to. We should welcome anything that tends to elevate us above the level of common, everyday work and set our ideals high. This should be of service to us, and should sink into our minds and help us each to do his duty in his work. Certainly, at times we are all quite ready to feel that there is little but drudgery in filling teeth. At such times we can take such words as we have just listened to and have them lift us up so that we may feel that there is something in our work besides drudgery. I am very glad indeed that we have had the opportunity to listen to such an address.

Dr. A. J. FLANAGAN, Springfield, Mass. My career in dentistry from personal experience would perhaps justify but few words. My memory recalls some years ago when I studied under a member of a dental society, a man who was called a practical dentist. I remember years ago, when I was perhaps seventeen years of age, going to a meeting in Smith's Hall, Springfield, Mass. I remember afterward speaking to my preceptor about the meeting, and he turned up his nose and said, "Well, it was a pretty good meeting, but it was not practical." Often since that time I have tried to contrast practicality and ideality. Ideality is beyond practicality. Ideality lifts a man up and beyond humdrum existence and makes him go one little point, no matter how small, beyond practicality. He becomes a better man. I do not believe that the dentist is undervaluing his profession. If we go back in the history of the world we find the same thing exists. We are all liable to think that we dentists are drifting to the bad, drifting in lines different from the past. You cannot go back. It is impossible. Let them, then,—these members of the dental association,—go and see if they cannot assist the younger members of the profession in a practical way on the question of income. The best evidence of the ideal in any profession is when some man who has more of the world's goods than the average steps out to help some man who has an ideal but who is struggling for an existence.

Dr. JAS. McMANUS, Hartford, Conn. You ask for a discussion of this paper. Personally, I cannot discuss it. I can only say I

enjoyed every word of it. If we could live up to it, it would make us all better men, do better service, and in every way help us to progress.

Mr. TOWNE (of The S. S. White Dental Mfg. Co.). I can say Amen most heartily to every word the doctor has said. I have come to the conclusion that the moral welfare of the individual is absolutely without a flaw when allied to right doing, and that there is no escape, no other way. I believe that it is far more important for a man to mold his soul and character than anything else in the world. I realize every day that there is coming into this world a very utilitarian idea, that there is work for each one, and we must realize joy in the growth of our characters, and we should bear in our bodies the results. These results are sure to come, and with them the moral desire to render divine service to our brothers.

Dr. FREDERICK BRADLEY, Newport, R. I. Mr. President and Gentlemen: I thank you most cordially for the kind words that you have given me. If there is anything I believe in, it is that the world is getting better gradually. If there is anything I fully believe in, it is that every man has some good in him, and if he will develop that good which is in him and make the most of it he will get out of life some satisfaction; but to think of labor as something to be gotten rid of, or to be submitted to, is a grave mistake. It seems to me that labor is the salvation of humanity. I would like to say a few words about looking out for No. 1. I have sympathy for that man who thinks, "What do I get out of this?" This is very natural for immature minds, but I tell you, gentlemen, it is "What can I give to these?" that is going to make men of you. It is "What can I give?" and not "What can I get?"

I do not mean that we as dentists should live in ruts, but that we should not forget the wonderful possibilities which come to us as men. I believe it is the duty of every man to have a sound body and a clear mind; and, above all that, I think that a man should want to have the keen intellectual sense which desires to attain to the ideal, and should want to have that something which, for want of a better word, I will call spirituality, which becomes a part of a man when he begins to develop that side of himself. It is through the feeling that we are not working for ourselves, but that we are working for our associates, that we can go on and be good workers for the helping of humanity, the uplifting of our brothers.

(To be continued.)

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

THE First District Dental Society of the State of New York held a regular monthly meeting Tuesday evening, October 9, 1900, at the New York Academy of Medicine, No. 17 West Forty-third street, New York city; the president, Dr. W. C. Deane, in the chair.

The secretary stated that Dr. Nelson T. Shields had forwarded to him two letters written in behalf of Dr. W. S. Carruthers, of Galveston, Texas, a sufferer in the recent calamity. The letters were

read, and Dr. Shields further stated that Dr. Carruthers was the oldest practitioner in Galveston, the first president of any dental society in Texas, and one who had always upheld the profession to the highest degree.

On motion of Dr. Walker, the sum of fifty dollars was donated from the treasury of this society, and the further sum of seventy-six dollars was contributed by individual members, amounting in all to one hundred and twenty-six dollars, which amount Dr. Shields was requested to telegraph to Dr. Carruthers, with the compliments of this society.

On motion of Dr. Hart, the secretary was instructed to notify all the members of the contribution, and to request subscriptions for a general fund for the relief of dentists in the Galveston district. In response to this appeal the sum of twenty dollars was contributed, and forwarded to Dr. H. W. Lubben, of Galveston, for distribution.

The paper of the evening, entitled "Immediate Root-Filling," was then read by Dr. GEORGE W. WELD. (This paper was published in the DENTAL COSMOS for December, 1900, page 1255.)

Discussion.

Dr. M. L. RHEIN. I was attracted to the meeting this evening by the well-known ability of the essayist and by the title of the paper announced, but I only really became interested in the subject when, to my surprise, the essayist had already finished. I was a little disappointed at the way in which he treated the matter. It is a very difficult question to know whether to discuss the subject at large or the paper, for, as far as the remarks of the essayist go, I believe there are very few practitioners to-day who take much stock in putting cotton in root-canals as a filling-material. But there is a point on this question of immediate root-filling that a little private discussion with a gentleman this evening brings vividly to my mind, and that is that it is too often the case that people who advocate any particular method of treatment are at once taxed with following that method of treatment indiscriminately in all cases. If a man says he believes in immediate root-filling they at once assume that he practices immediate root-filling on every pulpless tooth that comes under his attention. My own opinion is that very few men who have advocated immediate root-filling have dreamed that their opinion or their statement would be taken in this way, because there are many cases where this is far from advisable. Another point that the essayist brought out, upon which I disagree with him totally,—and I suppose discussion is meant to bring out the points of disagreement,—is when he spoke about the tooth where the pulp-chamber was filled with a semi-putrescent matter, and the patient suffered considerably from inflammatory conditions and distention by gases. He stated that it was necessary to get rid of the cause of the discomfort as speedily as possible, and consequently the tooth would be simply opened up, but the pulp was not to be removed from the tooth, but left for twenty-four hours, in order that the condition of affairs should quiet down. I personally dogmatically differ with him in that respect. I think the sooner the entire cause

of the trouble can be removed the better the result that can be obtained, for the cause does not rest entirely in the pulp-chamber, but goes to the very end of every single root; and if every particle of pulp-matter were removed at the first sitting it would be far better for the salvation of that tooth.

That brings up the problem the essayist mentioned, the financial question. That is where the rub comes, as to why this first operation is not made thorough enough,—the lack of time allotted to this particular patient and the operator unable to arrive at a decision between doing this work conscientiously or attending the patient already waiting on an appointment that has been previously made. I have frequently preferred to dismiss a waiting patient rather than make an incomplete removal of the pulp of a tooth. If the pulp of a tooth can be removed entirely from every root to the very end at the first sitting, so that all portions of the tooth are left absolutely aseptic, and then the roots immediately sealed, we have before us the most beneficial operation that can be performed for the patient. I object entirely to the remarks on that point where he says “approximately aseptic.” It should be thoroughly aseptic to the very ends of the root.

There is a certain percentage of cases, however,—I do not care to estimate how large a percentage it is,—where this absolute aseptic condition cannot be obtained at one sitting; not because the pulp cannot, with perseverance and skill, be removed from the tortuous canals, but through entirely other conditions being at fault. A very vital point in the filling of roots is the question of the diameter of the canal as it enters the end of the root; the severing of the pulp and the consequent hemorrhage that will drain into the canal through some condition of a particular root that is abnormal,—the question of overcoming this and placing the canals in such condition as to be entirely free from any exudation is one that frequently cannot be accomplished at the first sitting, and would most likely make an immediate root-filling of such a root result in disaster. It is in such cases that the judgment of the dentist comes into question. I believe it is necessary that this matter should be stated plainly,—that there are many cases where objections on this order interfere with immediate root-filling, and where it is preferable to pursue some other treatment.

In regard to the point raised by the essayist as to mummifying the tortuous and small canals, I want to say that for this purpose I do not believe any better preparation has ever been produced than that introduced by Dr. Schreier, of Vienna, to which the essayist called attention,—sodium and potassium,—and I want to add this: that while it was Dr. Schreier’s original idea to leave this mummifying pulp *in situ*, after considerable correspondence with the doctor, running over some years, I have convinced him not only of the ease and facility, but also the advantages that result from the removal of this mummified material after using the Schreier paste. I certainly believe that Dr. Schreier’s name should be attached to this preparation. Using this paste on a broach in the most tortuous canal causes whatever organic matter is present to become so

mummified and so removed from the inorganic portion of the root-structure that it becomes almost as easy with the fine root instruments now at our disposal to remove such remnants of pulp-tissue as it does to remove a root dressing. The secret of success in this work is found in giving the proper amount of time to cleansing these fine canals. Whether the patient can afford to pay for it is a question that also lies between the patient and the operator. It frequently is necessary for us to do work we do not get paid for, and if we start a piece of work it is our duty to finish it. Whether we get a proper compensation for it or not, we should always do it properly, and not allow ourselves to sacrifice the real salvation of any tooth for a question of dollars and cents.

Dr. GEO. EVANS. I have listened with interest to Dr. Weld's paper. In discussing it I wish to indorse some of the points Dr. Rhein has just brought out. The paper stated "immediate root-canal filling," and also dwelt considerably on the subject of drilling root-canals. The essayist seems to have passed over the latest and more improved methods of opening up canals. He cannot be ignorant of them, as those who are versed in these methods know that the era of drilling out root-canals is passed. Two or three years ago Dr. J. Foster Flagg, at the New Jersey State Society, in discussing the subject of root-canal filling, made this sensible remark: that in the last twenty years there has not been a single new idea advanced on the subject of root-canal treatment. I can go back farther than that,—nearly forty years, when I commenced studying dentistry. Since then there was very little really new presented, until Dr. Callahan brought out his idea of opening up canals with delicately formed instruments and sulfuric acid. There are very few canals but can be opened up with sulfuric acid in this way by enlarging the orifice and pumping up a strong solution of the acid. I use from fifty to seventy-five per cent., according to the case. I first operate with a smooth instrument, and work the acid gradually into the extremity of the canal; next I use Donaldson's broaches, the finest ones first. I generally first use one the serrations of which have been dulled a little, so they will not catch. In this manner I can traverse a most tortuous canal. As to immediate root-canal filling, I can sum it up in a few words. In the case of a tooth where a pulp has just been removed it is possible to safely fill the canal immediately, but in a tooth where there is any lesion or the slightest septic condition present it should not be filled until such condition is removed, and this cannot be reliably done *immediately*.

In regard to root-canal filling, in my opinion infection of root-canals does not ordinarily occur through the apical foramen, but from the oral cavity. Many fill root-canals with chloro-percha, and then fill the cavity with amalgam. In such cases when an abscess appears the reason is obvious. The infection of the tooth was caused by the shrinkage of the amalgam, which thus allowed the fluids from the oral cavity gradually to enter and generate a septic condition in the root-canals. Every root-canal should be sealed up hermetically, not only at the apex, but at the orifice. The orifice I generally close with oxychlorid of zinc.

As to root-canal filling and failures, I hardly would dare to put before the society to-night my statistics on the question and state how many years it is since abscess has occurred in cases where I treated the pulp-canals from the first. To accomplish this I simply follow out the methods I have just mentioned, and which have been mentioned by Dr. Rhein. When he states he has the success he has, I believe it because I have it myself. I hardly ever think of opening up the roots of an upper molar, without filling, in less than one hour, and I hardly ever make less than an hour engagement to open them, to say nothing of filling the tooth or crown.

Dr. NELSON T. SHIELDS. My experience in root-filling has been extensive, and the only time I would fill a root-canal immediately is after using cocain cataphorically. As soon as the hemorrhage has stopped, and if the patient's sitting is sufficiently long, we can safely fill it; if it is not sufficiently long we do it at the next sitting. Where the pulp is at all in a semi-decomposed state you risk your own reputation and think very little of the patient's comfort if the root is filled immediately.

Dr. EVANS. I spoke briefly of the use of sulfuric acid as an aid in opening up root-canals. There are many dentists in New York city who are not practicing it to-day. This method of treatment is one of the greatest advances in the treatment of root-canals, and Dr. Callahan deserves great tribute from this profession for what he has given to them. Generally in this respect practitioners do not receive the recognition and commendation they should. Nothing is brought before us more continually than the subject of pulpless teeth, and they take up much of our valuable time, for which most of us do not get proper remuneration.

Dr. RHEIN. While Dr. Evans's remarks are pertinent to the subject, with all due deference to Dr. Callahan, having practiced various methods, including Dr. Callahan's, and being eclectic in all such matters,—and I do not detract one iota from the high encomium Dr. Evans gives to Dr. Callahan,—I believe more credit is due to Dr. Schreier than to Dr. Callahan, and if there is to be any such testimonial of our regard it should be at least divided between the two gentlemen.

Dr. JOHN I. HART. I think we can epitomize the treatment of root-canals. It has almost become an axiom that when we obtain an aseptic condition, that root-canal is ready to be filled, and surely the remedies which have been enumerated have minimized the number of treatments which enables us to arrive at that result. I do not think that the permanent sealing of any root-canal is safe, where any degree of septic action has gone on at all, until a certain period of probation has passed after the tooth is sealed, and I think many of us put permanent fillings in that class of teeth far too soon.

Dr. S. L. GOLDSMITH. Cotton was referred to as a root-filling. I did not know that there were many legitimate practitioners who place cotton on even such a stand as to refer to it in regard to root-filling. Where cotton itself is left in a canal with any idea of permanence, it is, according to my views, little short of malpractice.

Dr. WILBUR M. DAILEY. I object to that term, Mr. President.

Dr. GOLDSMITH. I state only my opinion. I would like Dr. Rhein to give a definition of the term "mummification." I do not think it means anything like the condition that is brought about by the Schreier paste.

Dr. DAILEY. I removed a dressing of Dr. Essig's of *raw* cotton which had been in the tooth for thirty years, and found it in an aseptic condition.

Dr. SHIELDS. I warrant you it must have been an apex of infinitesimal size, or there would have been a great deal of discomfort.

Dr. EVANS. I removed a gold filling that was done by a prominent practitioner in Newark, one of our best operators. The apical foramen of that bicuspid tooth was wide open, and a pellet of cotton which closed the foramen and filled the whole pulp cavity had been there for years. There was not the slightest septic odor about it.

Dr. TRACY. I think Dr. Evans stated that pulp-chambers always became infected from without, but sometimes we find a tooth in a putrescent state, with accompanying unpleasant odor, which has never been opened from without. Now, where does the infection come from, if not from within?

By citing the case just mentioned I would not wish to be understood as believing that infection takes place from within in all cases.

Dr. GOLDSMITH. I think they can become infected in either way.

Dr. HENRY D. HATCH. If the doctor would recall the paper read at the New York State Society by Dr. Kirk he would get some light on that subject. The paper was on the etiology of those abscesses that occur on live teeth at the sides of the roots, although they occur rarely. He demonstrated how infection might be brought about by the blood current, by bacteria in the blood itself.

Concerning that cotton root-filling that did not stink, I presume every practitioner of experience has removed at least one such root-filling; but where I have removed one sweet one I have removed fifty that stank very badly.

Dr. WELD. The reading of a paper before a society of intelligent men may be compared to mastication. An intelligent discussion of it may be compared to digestion. In any event, an intelligent discussion of a paper must add interest to it, if it does not make it more valuable. If I have succeeded in causing a discussion I am perfectly satisfied.

Of course, those of you who followed my paper through will remember that I spoke of a tooth tender to the touch, and with more or less pericementitis; so that *immediate* root-filling does not necessarily mean *premature* root-filling. I have found that where there are mephitic gases in a tooth, if the pulp in the pulp-chamber be taken out and nothing further done to the tooth for twenty-four hours the patient will return the next day with the tenderness and soreness gone, and an operation can then be made with comparative immunity from after-trouble. If the operation be made the first day we are liable to add to the irritation and inflammation, the result being congestion and suppuration.

As to the question of "approximately aseptic" treatment. There is nothing perfect in this world, and there is nothing absolutely aseptic in the mouth for any length of time. Therefore I used the word "approximate."

As to the term "mummification." Dr. Schreier's method, if I understand the subject, is not a mummifying agent. It is saponification. He uses the sodium and potassium, and then pumps in water and cleans the canal out. He changes the character of the decomposed pulp, but he does not fill the root-canal; he does not pretend to. His idea is purely chemical. He says in his directions, "Use a syringe and wash out the 'soapy mass,'" the result of the chemical action between the decomposed matter and the sodium and potassium. The filling is another and distinct operation.

But root-drilling, I am afraid, is not a thing of the past, any more than filling roots with cotton. In this tooth, which I will pass around, the posterior root and the pulp-chamber were filled with cotton. An attempt had been made to fill the anterior roots with the same material,—an impossibility. I hold it is impossible to fill tortuous root-canals with cotton, even if you use sulfuric acid. You may enlarge them, but you cannot fill them with cotton or plastics of any kind and do it perfectly,—I mean from the pulp-chamber to the apex. I would like to see some one demonstrate it.

The society extended to the essayist a very cordial vote of thanks.
Adjourned. B. C. NASH, *Secretary*.

VERMONT STATE DENTAL SOCIETY.

At the twenty-fifth annual meeting of the Vermont State Dental Society, held at Pavilion Hotel, Montpelier, Vt., March 20-22, 1901, the following officers were elected for the ensuing year: Dr. C. W. Steele, Barre, president; Dr. J. A. Pearsons, Barton, first vice-president; Dr. J. H. Jackson, Burlington, second vice-president; Dr. T. Mound, Rutland, secretary; Dr. Grace L. Bosworth, Rutland, corresponding secretary; Dr. W. H. Munsell, Wells River, treasurer; Dr. J. A. Robinson, Morrisville, state prosecutor. Executive Committee, Dr. H. Burbridge, Woodstock; Dr. R. H. Newton, Montpelier; Dr. G. F. Barber, Brattleboro.

The next meeting will be held at Rutland, Vt., the third Wednesday in March, 1902.

GRACE L. BOSWORTH, *Rec. Sec'y*,
Rutland, Vt.

FIFTH DISTRICT DENTAL SOCIETY OF THE STATE OF NEW YORK.

At the thirty-third semi-annual meeting of the Fifth District Dental Society of the State of New York, held in the Yates Hotel, Syracuse, April 12 and 13, 1901, the following officers were elected: Dr. C. H. Barnes, Syracuse, president; Dr. S. Slocum, Oswego, vice-president; Dr. A. D. Wells, Skaneateles, secretary; Dr. Ira C. Curtis, Fulton, treasurer; Dr. J. H. Dower, Syracuse, correspondent; Dr. F. R. Adams, Vernon, librarian.

A. D. WELLS, *Sec'y*.

SEVENTH DISTRICT DENTAL SOCIETY OF THE STATE OF NEW YORK.

THE Seventh District Dental Society of the State of New York held its thirty-third annual meeting in Rochester, April 9 and 10, 1901.

The following officers were elected for the ensuing year: Wm. W. Belcher, Rochester, president; Fred. W. Proseus, vice-president; F. Messerschmitt, recording secretary; C. F. Bunbury, corresponding secretary; Leroy Requa, treasurer.

F. MESSERSCHMITT, *Sec'y.*

SOUTHERN MINNESOTA DENTAL SOCIETY.

THE annual meeting of the above-named society, held at Mankato, Minn., April 8, 9, and 10, 1901, was an innovation which possibly may become popular in the future. Instead of the usual program of papers by the members of the society, the time was given up to lectures by Dr. C. N. Johnson, of Chicago, and discussions and illustrations of the same, with clinics under his management. The subjects of his lectures are reported as follows: 1. "The Dental Pulp." (In this lecture he considered the subject in detail, referring to the protection of the pulp when nearly but not quite exposed, embodying the rules for the removal of decalcified dentin in the bottom of large cavities; management of pulps exposed by the operator; management of pulps exposed by the action of caries; indications for and against capping exposed pulps; methods of capping pulps.) 2. "Destruction and Removal of the Pulp." 3. "Methods of Filling Pulp-canals." 4. "Management of Pulpless Teeth." 5. "Diseases of the Gums and Peridental Membrane."

The following officers were elected for the coming year: Dr. F. J. Wagner, New Richmond, president; Dr. A. C. Searle, Owatonna, vice-president; Dr. A. C. Rosenquist, St. Peter, secretary; Dr. M. B. Wood, Mankato, treasurer.

CONNECTICUT ODONTOLOGICAL SOCIETY.

A MEETING was held in Hartford, Conn., February 12th, to take into consideration the matter of forming a new state dental society. A temporary organization was formed, and a committee of three was appointed to draw up a constitution and by-laws, to be reported at a subsequent meeting to be called at the Tontine Hotel, New Haven, March 12th. Accordingly forty members of the profession met at New Haven and perfected the organization, which was called the "Connecticut Odontological Society."

The following officers were elected: Drs. W. H. Pomeroy, Hartford, president; S. L. G. Crane, Hartford, vice-president; C. W. Howgate, Greenwich, secretary; M. L. Hitchcock, Ansonia, treasurer. Executive Committee—Drs. J. H. Mallery, Hartford;

L. D. Monks, New Haven; J. E. Beardsley, Bridgeport. Auditing Committee—Drs. E. S. Darner, Bridgeport; D. R. Beebe, Bridgeport; L. W. Coley, New Haven. Committee on Membership—Drs. F. D. Clark, Hartford; P. J. Dahlen, Hartford; J. H. Mallery, Hartford.

The meeting was enthusiastic and harmonious throughout, and there is promise of forming a large society on a broad and liberal basis.

The next meeting will be held at Bridgeport, June 4, 1901.

C. W. HOWGATE, *Sec'y*.

DENTAL SOCIETY ANNOUNCEMENTS.

AMERICAN MEDICAL ASSOCIATION—SECTION ON STOMATOLOGY.

THE next meeting of the American Medical Association will be held at St. Paul, Minn., June 4, 5, 6, and 7, 1901. The Section on Stomatology presents the following program:

Chairman's Address. R. R. Andrews, Cambridge, Mass.

Symposium on State Boards of Dental Examiners in their Relation to the Profession and the Colleges:

1. Methods of Appointment: (a) By state universities. (New York.) (b) By state boards of state officials *ex-officio*. (Nebraska.) (c) By governors on recommendation of the profession. William Carr, New York city.
2. Revenue for Conducting the Work of the Boards of Examiners. (a) By taxation of the people. (b) By fees from examination of candidates. (c) By taxation of the profession. George L. Parmele, Hartford, Conn.; V. E. Turner, Raleigh, N. C.

3. The Dental College Standard: (a) Is it what it should be? (b) If not, what improvements should be made? (c) How may the requirements be improved? Charles Chittenden, Madison, Wis.

4. Licensing: (a) By examination. (b) By diploma. J. A. Libbey, Pittsburg, Pa.

Symposium on Degeneracy of the Pulp:

1. Preliminary Work. Eugene S. Talbot, Chicago.
2. Literature of the Pulp. Vida A. Latham, Rogers Park, Ill.
3. Cutting, Staining, and Mounting. Martha Anderson, Moline, Ill.
- Local Anesthesia. A. H. Peck, Chicago, Ill.
- Paradental Atrophy. W. E. Walker, Pass Christian, Miss.
- Periods of Stress and their Dental Marks. Jas. G. Kiernan, Chicago.
- Surgical Treatment of Cleft Palate. G. V. I. Brown, Milwaukee, Wis.
- Infectious Diseases. Alice Steeves, Chicago.
- Simple Gingivitis. Geo. T. Carpenter, Chicago.

Military Dental Practice; Its Modifications and Limitations. Henry D. Hatch, New York city.

The Tongue as a Breeding-place for Bacteria. M. H. Fletcher, Cincinnati, Ohio.

Pathology of the Alveolar Process. Eugene S. Talbot, Chicago.

Tuberculosis of the Alveolar Process and Surrounding Tissues, and a Few Methods of Differential Diagnosis. V. A. Gudex, Milwaukee, Wis.

The officers of the Section invite all to be present and to take part in the discussions.

Those who desire to join the association must obtain credentials from their state or local dental societies and pay five dollars to the secretary of the association. This will entitle them to the *Journal* for one year.

R. R. ANDREWS, *Chairman*,
EUGENE S. TALBOT, *Sec'y*,
Section on Stomatology.

ILLINOIS STATE DENTAL SOCIETY.

THE thirty-seventh annual meeting will be held in Rockford, May 14 to 17 inclusive. All members should make an effort to be present. The society is always glad to welcome reputable dentists, who are not members, from this and other states.

The Local Committee has arranged for an informal reception on Tuesday evening in the parlors of the Hotel Nelson. A short program has been prepared, and all in attendance are cordially invited to be present.

PROGRAM.

President's Annual Address. J. G. Reid, Chicago.

Report of Committee on Dental Science and Literature. A. W. Harlan, Chicago.

Report of Committee on Art and Invention. Hart J. Goslee, Chicago.

Papers.—"Why Fillings Fail," T. F. Henry, Streator; "Cement Anchorage for Fillings," J. J. Reed, Rockford; "Dental Jurisprudence," Edwin Hedrick, Esq., Peoria; "Anomalous Cases of Malformed Teeth, with Suggestions as to Possible Causes," Israel P. Wilson, Burlington, Ia.; "Preventive Dentistry," Garrett Newkirk, Los Angeles, Cal.; "Air Chambers—Uses and Abuses," Alfred O. Hunt, Chicago; "Orthodontia," illustrated with lantern slides, J. N. McDowell, Chicago; "Submarine Gold," illustrated by stereopticon lantern, George A. McMillen, Alton; "Antiseptic, Germicide and Disinfectant," A. H. Peck, Chicago; "The Physiological Function of Saliva," J. B. Dicus, Chicago; "Microbiology and Office Clinic," George D. Sitherwood, Bloomington; "The Philosophy of Mastication—Relative to Artificial Dentures," B. J. Cigrand, Chicago; Report of Supervisor of Clinics, J. E. Hinkins, Chicago.

Clinics.—1. Harlan, A. W., Chicago: Pyorrhea alveolaris. 2. Cormany, J. W., Mt. Carroll: Gold filling, using Bonwill's mechanical mallet. 3. Hancock, J. E., Joliet: Porcelain crown. 4. Callahan, J. R., Cincinnati, Ohio: Gold and tin in definite proportions for filling. 5. Roach, F. E., Chicago: Practical application of the wedge-lock facing. 6. Corbett, C. C., Edwardsville: Amalgam filling, cement anchorage. 7. Lukens, C. DeWitt, St. Louis, Mo.: Orthodontia. 8. Taggart, W. H., Chicago: A. E. Peck's complete system for making porcelain inlay and restoration to absolutely fit the cavity. 9. McIntosh, F. H., Bloomington: A method of building up broken-down bicuspsids and molars preparatory to receiving a gold crown. 10. Reeves, W. T., Chicago: Porcelain inlay or restoration. Exhibition of the Hammond electric furnace. 11. Brophy, Truman W., Chicago: Surgical clinic. 12. Wikoff, B. D., Chicago: A novel method of making a bridge. 13. Allen, E. H. Freeport: Gold filling. 14. McCandless, A. W., Chicago: (a) Setting crowns and bridges with gutta-percha, using Kerr electric annealer to soften

the gutta-percha; (b) alteration of plaster model, adapting ideal dental base plate to insure snugly fitting denture. 15. Gilmer, Thos. L., Chicago: Surgical clinic. 16. Chappell, O. A., Elgin: Application and use of dead soft gold. 17. Ames, W. V-B., Chicago: Subject to be announced. 18. Pruyn, Chas. P., Chicago: Pressure anesthesia for removal of a live pulp. 19. Pfeifer, Josephine D., Chicago: Filling root-canals. 20. James, A. F., Oak Park: Ladmore and Bronson matrix. 21. Carpenter, Elliott R., Chicago: Pyorrhea at root bifurcations and its treatment with oxyphosphate of copper. 22. Cattell, D. M., Chicago: Filling a proximo-occlusal cavity in a bicuspid or molar; gingival one-third with non-cohesive cylinders or mats; occlusal two-thirds, including step anchorage with cohesive gold. 23. Royce, E. A., Chicago: Demonstration of the varying shades of the natural teeth in the same mouth as applied to artificial dentures. 24. Good, Robert, Chicago: Pyorrhea alveolaris; Younger's method. 25. Johnson, C. N., Chicago: Preparation of cavities. 26. Duncan, S. F., Joliet: Gold filling, using the Berry electric engine and mechanical mallet No. 2. 27. Stewart, L. K., Chicago: Long bites in continuous gum-work. 28. Shryock, W. W., Fort Wayne, Ind.: Swedging seamless gold crown. 29. Crissman, I. B., Chicago: Labial cavity extending under the gum, filled with De Trey's gold, without rubber dam. 30. McMillen, Geo. A., Alton: Use of submarine gold. 31. Hunt, A. O., Chicago: Uses and abuses of air chambers, also W. E. Griswold's removable bridge. 32. Johnson, A. G., Chicago: A novelty for the assistance of annealing and carrying gold. 33. Bridges, J. S., Chicago: Porcelain inlay, demonstrating the Ash swedge. 34. Rohland, C. B., Alton: Subject to be announced. 35. Prothero, J. H., Chicago: Arrangement and occlusion of teeth. 36. Brown, J. O., Chicago: Contour filling, using Watt's crystal gold. 37. Slonaker, J. W., Chicago: Nitrous oxid gas. 38. Dittmar, G. W., Chicago: Proximo-incisal cavity; step anchorage; showing cavity preparation and gold filling; using Rowan's cylinders and No. 20 extra cohesive foil. 39. Green, W. F., Evanston: Subject to be announced. 40. Davis, L. L., Chicago: Celluloid cement filling. 41. Case, C. S., Chicago: Restoration of facial contours by a combination of orthopedia and prosthesis; especially applicable for cleft palate patients. 42. Powell, C. B., Jacksonville: Treatment of root-canals, demonstrating the use of a new broach-holder of the clinician's own design. 43. Black, G. V., Chicago: Demonstrations of mallet force, using tuftodynamometer.

(Signed) C. R. TAYLOR, Streator,
Executive Committee.
 J. E. HINKINS, Chicago,
Supervisor of Clinics.

TRI-STATE DENTAL MEETING.

THIS will be the largest meeting of the summer and one of the best. All roads run to Indianapolis, and every dentist in the United States who is conducting his practice in a legitimate manner is urged to come and break bread with us. We do not care whether you are a member of a state association or not, if you "do unto others as you would they should do unto you."

The third triennial meeting under the auspices of the State Associations of Ohio, Michigan, and Indiana, will occur June 4, 5, and 6, 1901, at Indianapolis, Ind. The German House, corner of Michigan and New Jersey streets, has been secured for the meeting and exhibits. The Central Passenger Association has granted a round-trip rate of a fare and a third, on the certificate plan. Any inquiries addressed to 131 East Ohio street, Indianapolis, will be cheerfully answered. The program to date includes—

Papers.—1. Charles N. Johnson, L.D.S., Chicago, Ill.: "Critical Periods in the History of the Human Teeth." 2. Frederick J. Capon, M.D.S., D.D.S., Toronto, Can.: "Porcelain as an Art in Crown-Work." 3. C. M. Wright,

M.D., D.D.S., Cincinnati, Ohio: "Diseases of the Gums and Sockets of the Alveoli." 4. W. H. Whitslar, M.D., D.D.S., Cleveland, Ohio: "Dental Neurasthenia." 5. J. L. Young, D.D.S., Detroit, Mich.: "Some Considerations in Modern Bridge-Work." 6. Nelville S. Hoff, M.D., D.D.S., Ann Arbor, Mich.: "A Study of Tooth Bleaching." 7. William A. Heckard, D.D.S., Indianapolis, Ind.: "Continued Anesthesia with Nitrous Oxid Under Definite Pressure." 8. George E. Johnson, D.D.S., Ft. Wayne, Ind.: "The Human Face and Articulate Speech Divine."

Exhibits and Clinics.—1. F. J. Capon, Toronto, Can.: Porcelain inlays. 2. C. E. Esterly, Lawrence, Kan.: Some compressed air appliances. 3. H. P. Carlton, San Francisco, Cal.: A matrix. Knowles plugger for matrix work. An oxyphosphate cement. 4. W. H. Cudworth, Milwaukee, Wis.: Porcelain inlays. 5. C. V. Vignes, New Orleans, La.: Extracting forceps with removable beaks, and new amalgam carrier. 6. C. S. Case, Chicago, Ill.: Subject to be announced. 7. E. J. Perry, Chicago, Ill.: Prosthetic wrinkles. 8. W. E. Griswold, Denver, Col.: System of retaining springs for saddle plates and removable bridges. 9. Hart J. Goslee, Chicago, Ill.: Porcelain crown- and bridge-work. 10. George B. Perry, Chicago, Ill.: Method of mounting and truing wheels for engine and lathe. 11. J. P. Carmichael, Milwaukee, Wis.: Abutment piece in bridge-work, and a support in extensive gold and porcelain inlays. 12. John E. Nyman, Chicago, Ill.: Carved solid cusps for gold crowns. 13. R. B. Tuller, Chicago, Ill.: Some suggestions about the use of matrices. 14. W. E. Harper, Chicago, Ill.: Exhibit of prepared cavities, with practical suggestions. 15. J. J. Wright, Milwaukee, Wis.: An appliance for keeping the field dry while setting crowns and bridges. 16. W. E. Grant, Louisville, Ky.: Some appliances used in orthodontia. 17. J. W. Clark, Louisville, Ky.: Combination filling, amalgam and gold at same sitting. 18. H. L. Ambler, Cleveland, Ohio: Filling teeth with improved tin foil. 19. C. R. Butler, Cleveland, Ohio: Adaptability of a new form of scalers. 20. W. A. Price, Cleveland, Ohio: Application of Roentgen rays in dentistry. (a) Results obtainable, and how to interpret them—demonstrated with lantern slides. (b) Apparatus necessary, and how to use it—demonstrated. (c) Practical cases. 21. L. E. Custer, Dayton, Ohio: Subject to be announced. 22. E. Ballard Lodge, Cleveland, Ohio: Matrix and matrix plugger. 23. S. D. Ruggles, Portsmouth, Ohio: The removal of excess cement in setting crowns. 24. F. A. Bozer, Logansport, Ind.: Comparative anatomy exhibit. 25. F. R. McClanahan, Rushville, Ind.: Possibilities of the dental plate. 26. H. A. Moyer, Kendallville, Ind.: Richmond crown with soldered filling. 27. E. E. Reese, Indianapolis, Ind.: Porcelain inlays. 28. Blair Blackmarr, Jackson, Mich.: Subject to be announced. 29. W. H. Dorrance, Ann Arbor, Mich.: Subject to be announced. 30. J. L. Young, Detroit, Mich.: Continuous gum-work. 31. John L. Sweetman, Manistee, Mich.: Something new in crown-work. 32. L. F. Owen, Grand Rapids, Mich.: Gold inlays. 33. H. D. Watson, Grand Rapids, Mich.: Seamless platinum cap for porcelain work. 34. C. W. Miller, Chicago, Ill.: Contouring pliers. 35. George Edwin Hunt, Indianapolis, Ind.: A scientific instrument for measuring bulk changes in plastics. 36. Truman W. Brophy, Chicago, Ill.: Stereopticon exhibition on surgery of the palate.

For further information, address

GEO. E. HUNT, *Chairman*,
131 E. Ohio st., Indianapolis, Ind.

KANSAS STATE DENTAL SOCIETY.

THE Kansas State Dental Society will hold its session in Leavenworth, on Wednesday, Thursday, and Friday, May 8, 9, and 10, 1901, at Planters Hotel.

R. MATTHEWS, *Pres.*, 128 Main st., Wichita, Kan.

NEW JERSEY STATE DENTAL SOCIETY.

THE meeting to be held at Asbury Park, N. J., July 17 to 19 inclusive, promises to be the greatest meeting in the history of state societies from an educational standpoint. The applications already on file for exhibition spaces exceed those of last year, insuring a display of dental appliances, etc., which will almost entirely fill the great Auditorium. The young graduates will do well to avail themselves of this opportunity, so planning their vacation that they may combine business with pleasure and see all the very latest appliances which will be on exhibition.

The "Hornets" wish it distinctly understood that the latch-string will be upon the outside of the door during the meetings.

WM. L. FISH, *Ch'man Exhibit Committee.*

DISTRICT OF COLUMBIA DENTAL SOCIETY AND MARYLAND STATE DENTAL ASSOCIATION.

THE fifth annual meeting of the District of Columbia Dental Society and the Maryland State Dental Association will be held in Baltimore, Md., May 16, 17, 18, 1901. Please mark these dates off on your appointment book at once.

B. HOLLY SMITH, *Chairman of Joint Committee,*
1007 Madison ave., Baltimore, Md.

COLORADO STATE DENTAL ASSOCIATION.

THE fifteenth annual meeting of the Colorado State Dental Association will be held in Denver, Tuesday, Wednesday, and Thursday, July 9, 10, and 11, 1901.

H. F. HOFFMAN, *Sec'y,*
California Bldg., Denver.

MISSOURI STATE DENTAL ASSOCIATION.

THE Missouri State Dental Association will hold its thirty-seventh annual session at Sedalia, Mo., July 9, 10, 11, and 12, 1901. All reputable dentists are cordially invited to be present and participate in the proceedings.

B. L. THORPE, *Cor. Sec'y,* St. Louis, Mo.

TEXAS STATE DENTAL ASSOCIATION.

THE next annual meeting of the Texas State Dental Association will be held May 14, 15, and 16 (instead of the third Tuesday in May, as heretofore announced), at Sherman, Texas. The profession cordially invited.

J. G. FIFE, *Sec'y,*
O. B. LOVE, *Pres.,* Dallas, Texas.

MINNESOTA STATE DENTAL ASSOCIATION.

THE eighteenth annual meeting of the Minnesota State Dental Association will be held in Duluth, Minn., on Thursday, Friday, and Saturday, August 1, 2, and 3, 1901.

GEO. S. TODD, *Sec'y,* Lake City, Minn.

MASSACHUSETTS DENTAL SOCIETY.

THE thirty-seventh annual meeting of the Massachusetts Dental Society will be held at the Massachusetts Institute of Technology building, Boston (Huntington Hall), Wednesday and Thursday, June 5 and 6, 1901. The committee has secured a goodly amount of talent, and the meeting promises to be well worth the consideration of the profession.

EDGAR O. KINSMAN, *Sec'y*,
Cambridge, Mass.

FLORIDA STATE DENTAL SOCIETY.

THE eighteenth annual meeting of the Florida State Dental Society will be held at Tampa, in the parlors of the Almeria Hotel, at 10 o'clock, Wednesday, May 22, continuing in session four days. (The change of date from the 15th to the 22d has been deemed expedient.) A cordial invitation to all reputable dentists is hereby extended.

L. C. ELKINS, D.D.S., *Pres.*
CARROLL H. FRINK, D.D.S., *Sec'y*.

NATIONAL DENTAL ASSOCIATION, SOUTHERN BRANCH.

THE fourth annual meeting of the Southern Branch, National Dental Association, will convene July 29, 1901, at Nashville, Tenn.

C. L. ALEXANDER, *Cor. Sec'y*, S. B. N. D. A.

OHIO STATE BOARD OF DENTAL EXAMINERS.

THE next meeting of the Ohio State Board of Dental Examiners will be held in Columbus, Ohio, beginning on Tuesday, May 28, 1901.

Applicants must bring excavators, pluggers, clamps, rubber dam, and filling-materials.

For further particulars and application blank, write to

L. P. BETHEL, *Sec'y*, Kent, Ohio.

MARYLAND STATE BOARD OF DENTAL EXAMINERS.

THE Maryland State Board of Dental Examiners will hold examinations for certificates to practice dentistry on Tuesday and Wednesday, May 7 and 8, 1901, at the Baltimore College of Dental Surgery, corner Eutaw and Franklin streets, Baltimore, Md.

Application blanks and all information will be furnished by the undersigned.

F. F. DREW, *Sec'y*,
701 N. Howard st., Baltimore, Md.

COLORADO STATE BOARD OF DENTAL EXAMINERS.

THE Board of Dental Examiners for the state of Colorado will meet in Denver, June 3, 1901, at 10 A.M., to examine applicants for license.

In addition to the usual written and oral examination, candidates must supply their own patients, and come prepared with all necessary instruments, rubber dam and gold, to perform practical operations under the supervision of the board, which will pass on suitable selections of cavities.

H. F. HOFFMAN, *Sec'y*,
California Building, Denver, Col.

FLORIDA STATE BOARD OF DENTAL EXAMINERS.

CHANGE OF DATE OF MEETING.

THE Florida State Board of Dental Examiners will meet in Tampa, Fla., at the Court-house, at 10 A.M., May 21, 1901, for the purpose of examining applicants to practice dentistry in this state.

You will notice the change of date from May 14th to May 21st.

Any information will be given by the secretary.

W. G. MASON, *Pres.*,

Tampa, Fla.

F. B. HANNAH, *Sec'y*,

Umatilla, Fla.

NATIONAL ASSOCIATION OF DENTAL FACULTIES.

THE next meeting of the National Association of Dental Faculties will meet in Milwaukee, Wis., Friday, August 2, 1901, at 10.30 A.M. The Executive Committee will meet in session Thursday, August 1st, at 2 P.M. According to rule, all colleges will be expected to have a copy of their annual announcement for the coming session in the hands of the Executive Committee at that time.

S. W. FOSTER,

Sec'y Executive Committee N. A. D. F.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

THE nineteenth annual session of the National Association of Dental Examiners will be held at the Plankinton Hotel, Milwaukee, Wis., Friday, August 2, 1901, commencing at 10 o'clock A.M., and continuing in session Saturday and Monday. Arrangements are under way for those residing in the middle and eastern states for reduced fares by the Lehigh Valley Railroad from New York and Philadelphia. Full particulars in June dental journals.

CHARLES A. MEEKER, D.D.S., *Sec'y*,

29 Fulton street, Newark, N. J.

EDITORIAL.

THE ANNUAL MEETINGS.

THE season is near at hand when professional work will be temporarily set aside for the consideration of those questions which constitute the active forces of professional life, and for the deliberation of which the great annual meetings will be held, not only in this country, but wherever dentistry has a corporate existence throughout the world. The science and the art of dentistry will receive a due share of attention, and the results of study and experience will be spread broadcast among the profession from these clearing-houses of dental thought through the medium of our periodical literature. It is this product of professional endeavor which claims the interest and attention of the great bulk of those who make up the dental profession, and by the simple majority of numbers their professional interest is the one which should have

first consideration in making up the programs of our annual meetings. It cannot be denied that the interests of the main body of dental practitioners have not always received due consideration in the selection of material for presentation on these recurring occasions, for it too often happens that the feelings of the essayist, and not those of the audience, have been consulted, if one may judge from what has been selected. Too often the demand has apparently been in excess of the supply of interesting and valuable papers, with the result that a committee has been compelled to take what was offered or what it could get, even to the extent of accepting matters which have done duty one or more times on the programs of previous meetings. Another palpable defect in program arrangements is the plan of sending a round-robin circular of questions to a selected group of practitioners, and requesting an expression of individual views, which is presented in the form of an *olla podrida* report for discussion at the meeting. This sort of program padding is not simply a negative evil in our dental meetings, but a positive damper upon the interest which it is the function of a professional meeting to arouse, and one of the main reasons why our dental meetings are attended by such a relatively small proportion of the whole professional body. The preparation of a program is an important and serious matter; that it presents obstacles of considerable magnitude, no one who has had experience will dispute, but there are certain features which tend toward failure which can at least be guarded against and largely eliminated; there are other elements which make for success, and these should be guarded and cultivated to the advantage of the whole profession. Among the former are those already referred to, and we would include also the elimination of all essays and other written matter which upon its internal evidence is merely written to fill time and space.

Among the factors which make for success, there is none which contributes more largely to the interest of a dental meeting than a presentation and discussion of new ideas. But the committee complains that "original or novel matter is not to be obtained; the original investigators are but a minor class in dentistry, and the writers of essays are almost as few." We doubt both propositions. Many years ago it was asserted that the profession was "largely written out," since which time some of the most important scientific work in dentistry has been published. The lack of originality is with the committee more often than with the profession. Every man in his profession is in his degree an original investigator or he drops out as an incompetent. He cannot practice without

using his powers of observation, and it is the record of experience based upon accurate observation which is the end of original research work; and it is that which is needed to place our dental meetings upon the high plane of usefulness which they are intended to occupy. Let the committee begin with the belief that every man is an observer and student of his work, create a demand for the records of each man's experience in the conduct of his profession, make such records the main features of our dental meetings, and there will be no lack of interest to complain of. A policy of the character referred to would do much more if persistently followed up. It would stimulate original research by the more exact methods of the laboratory, so that clinical records would be revised and corrected by observations made under controlled and exactly limited conditions, and tend to eliminate or at least largely reduce empiricism in our modes of practice.

Beside the practical, scientific, and art phases of our professional work, there are constantly pressing for adjustment those conditions related to our educational, legal, and political development. Our educational plans and methods have, through the attrition of practical test and experience, shown a tendency to lose their strong distinctive points of difference, and the consideration of our educational problem is gradually bringing harmony into our teaching methods with the prospect of something like uniformity in the standard dental curriculum as a not remote possibility. Similar forces are influencing dental legislation to the same end. Nor is this tendency manifested only in the United States, for, as will be seen elsewhere in this issue, an International Commission appointed by the Executive Council of the Third International Congress has been called to meet in London for the purpose of considering dental education in its international relations.

Education, legislation, and professional policy involve problems which, to the busy practitioner, may appear to be secondary in importance to those matters which in the program of a dental meeting he finds are directly applicable to his practical needs, but the very essence and fountain-head of that class of practical knowledge which he desires to utilize is found in the successful attainment of better education, legislation, and professional policy. The most practical man in dentistry, as elsewhere, is the man who knows the most about his subject, and it is the end of dental education to supply that need. The dental meeting, then, from whatever point we may view it, is a necessary factor in professional progress both to the individual and to the whole body of practitioners, and all available intelligent effort should be expended toward making them a success in each case.

A NON-ADVERTISING DENTAL CONTRACT.

THE following declaration must be signed by all candidates for the license to practice dentistry issued by the Royal College of Surgeons in Ireland:

"DECLARATION BY A LICENTIATE IN DENTAL SURGERY.

"I, A. B., hereby solemnly and sincerely declare that I am twenty-one years of age and upward, and that if I shall be granted the License in Dental Surgery of the Royal College of Surgeons in Ireland, and so long as I hold the same, I will not seek to attract business by advertising, or by any other practice considered by the College to be unbecoming; and I agree that such license shall be canceled on its being proven to the satisfaction of the President and Council that I have done so."

We understand that by virtue of the legal powers conferred upon the Royal College of Surgeons the foregoing declaration has, when signed, the force of a contract, and that under such a contract the license is revocable,—has been revoked, as a matter of fact, in a number of cases where the provisions of the declaration have been violated, the result being that no licentiates of the Royal College of Surgeons of Ireland are engaged in advertising. The possibility of bringing into effective use a contract of similar character in America has been frequently agitated, but has failed of accomplishment for the reason that it would be necessary, in any state where such a contract was made, that provision be made for its legality by inserting in the dental law of that state a clause making it one of the conditions for the legitimate practice of dentistry,—the principle being that the contract must be made between the licentiate and the licensing power, which in this country is the state.

DENTAL SECTION OF THE ARMY MEDICAL MUSEUM AND LIBRARY.

THE National Dental Association Committee on Museum and Library have issued the following appeal to the profession:

1022 FOURTEENTH ST., WASHINGTON, D. C., March 25, 1901.

Dear Doctor,—With no other apology than that the subject is important, we beg to again call your attention to the Dental Section of the Army Medical Museum and Library. The effort made to represent here the attainments of dentistry proved an aid in securing the recent legislation creating a dental corps for the U. S. Army. But now that the dental corps is being organized, may we not expect a more general recognition of the duty of every member of the dental profession to contribute to the scientific value of this great institution—our national depository? All current dental literature and some museum material have been provided for at government expense, but a museum cannot be built up by purchases alone. The profession must con-

tribute most of the specimens necessary to illustrate the art of dentistry and supply the data on which the advancement of its science depends.

Our efforts heretofore have failed to secure illustrations of the methods of treating fractures, sections, wounds, etc., of the jaws and bones of the face; there is now more especial need of models, photographs, drawings, and appliances to illustrate dental methods in this class of cases.

Yours fraternally,

WMS. DONNALLY,

HENRY W. MORGAN,

JOHN S. MARSHALL,

Committee on Museum and Library

National Dental Association.

THE INTERNATIONAL DENTAL FEDERATION: BULLETIN OF THE EXECUTIVE COUNCIL.

THE following bulletin, recalling the action of the Third International Dental Congress relative to a permanent international dental organization, and covering the resolutions passed in pursuance of that object at the closing sitting of the Congress, has been issued by the Executive Council then appointed:

First let us recall that the International Dental Congress resolved that an International Dental Federation should be created, and that the national committees promoted in view of this Congress should be maintained and constitute this International Dental Federation.

It was also resolved that the said federation, formed of all the existing national committees, should be represented by an Executive Council. A resolution was also passed that the first Executive Council, consisting of nine members, should be appointed by the members of the Congress at the general meeting of August 14, and that its powers should expire at the opening of the Fourth International Dental Congress, which it will organize.

The Executive Council was instructed to appoint the International Educational Committee at its first sitting, to be held on the 15th of August, at 9.30 A.M., in the Ecole Dentaire de Paris.

In accordance with the resolution passed at the closing general meeting, on the 14th of August, the International Commission, consisting of MM. Aguilar, Cunningham, Förberg, Godon, Grevers, Harlan, Hesse, Pichler, and Sauvez, held its first sitting on Wednesday, August 15, at the Ecole Dentaire de Paris. All the members were present at this meeting with the exception of Dr. Hesse (who had deputed his powers to MM. Godon and Sauvez), and Drs. Grevers and Pichler.

The meeting elected as chairman M. Godon, and as secretary-treasurer M. Sauvez, and voted the following resolutions:

The office of the Executive Council shall be for the present situated in Paris, France, at the Ecole Dentaire de Paris (45, rue de la Tour-d'Auvergne), and abroad at the address of each member of the commission.

The title chosen is that of Conseil Exécutif de la Fédération Dentaire Internationale.

The council shall consist of the nine titular members elected by the Congress, and of additional members chosen after consultation with the national committees. Their powers shall expire with the next Congress. The Council will be administered by its officers, and represent the profession without any distinction as to nationality.

The officers will remain in office until the next meeting, to be held in England, in August, 1901.

The Executive Council shall draw up a scheme of regulations to be adopted at the next meeting, and shall fix the time and place of the next Congress. The Council has appointed and will add to the number of the International Educational Committee as well as such other committees as may be deemed necessary.

The Committee on Education is composed as follows:

AGUILAR, of Madrid.	HESSE, of Leipzig.
ARKÖVY, of Buda-Pesth.	KIRK, of Philadelphia.
BROPHY, of Chicago.	LIMBERG, of St. Petersburg.
BURNE, of Sydney.	MARTINIER, of Paris.
CUNNINGHAM, of Cambridge.	PATERSON, of London.
GODON, of Paris.	QUEUDOT, of Paris.
GREVERS, of Amsterdam.	ROSENTHAL, of Brussels.
GUILLERMIN, of Geneva.	SANDSTEDT, of Stockholm.
GIURIA, of Genoa.	

The officers are *ex-officio* members of all committees, and will direct them until each committee is constituted.

A sub-committee of three members was appointed to prepare and draw up a report on a scheme of regulations.

A report will also be prepared by the sub-committee on the organization of the Committee on Education, and will be laid before the meeting in England.

The Executive Council will hold its next meeting in England, in August, 1901, at the same time as the annual general meeting of the British Dental Association.

The sub-committee, composed of MM. Cunningham, of Cambridge, Godon, and Sauvez, held its first meeting on the 28th of November. Several resolutions were passed, among which should be mentioned the foundation of an International Review, which will be published in December, and contain the official reports of the Executive Council of the International Dental Federation.

The sub-committee also resolved to issue to the presidents and secretaries of the national committees a list of the resolutions passed at the closing sitting of the Congress.

VOLUME OF TRANSACTIONS OF THE THIRD INTERNATIONAL DENTAL CONGRESS.

The Direction Committee of the Executive Council in its sitting on the 4th of October, 1900, passed the following resolutions:

1st. The Report of the Proceedings of the Congress will consist of three volumes containing, altogether in about 1800 pages, all the communications

and contributions *in extenso*, the stenographic notes of same, with illustrations and the various documents and their annexes in the languages used at the Congress.

2d. The National Committees are requested to inform the General Secretary of the number of volumes they intend to subscribe for, in the name of societies or corporations, schools, technical newspapers, libraries, and dental corporations, at the price of thirty-six francs for a set of three volumes, the number of the printed copies being limited.

3d. Societies, schools, technical reviews, dental manufacturers and depots, chemists, and in general all those desirous of advertising in all languages in these volumes, and of addressing themselves to dentists all over the world, are informed that the price of a page, for advertisements, is one hundred francs, and that of half a page, sixty francs (more than six pages being not devoted to such advertisement in each volume), and they may apply to Dr. Sauvez, general secretary, 17, rue de Saint-Pétersbourg, and come to an agreement as to the wording and classification of their advertisements in the said volumes.

The free subscriptions, either from societies, schools, or individuals, are to be forwarded to M. Viau, treasurer, 47 Boulevard Haussmann; the subscriptions will be more especially applied to the purchasing of the cuts, as all the other funds that the officers of the Congress may be able to raise are for the present to be devoted exclusively to the book of Proceedings.

FOREIGN RELATIONS COMMITTEE OF THE NATIONAL ASSOCIATION OF DENTAL FACULTIES.

CORRESPONDENCE RELATING TO THE STATUS OF THE AMERICAN DENTAL DEGREE IN EUROPE.

THE Foreign Relations Committee, to whose jurisdiction has been referred all foreign educational matters affecting the interests of the National Association of Dental Faculties, has been in receipt of a great mass of correspondence concerning the status of the distinctive American dental degree in Europe and the effect upon public opinion there of the almost open sale of diplomas issued by fraudulently conducted but regularly chartered schools in the state of Illinois, and their quasi-recognition by the Illinois State Board of Dental Examiners,—who, it is charged, have admitted to state dental examination and granted permits to practice to foreign possessors of these irregular degrees obtained, in some instances, after their having been in this country for less than a month.

At the last meeting of the National Association of Dental Faculties, upon the recommendation of the Foreign Relations Committee, the work of the suppression of the irregular and fraudulent schools was placed in the hands of the Committee on Law, but, as the first-named committee is in constant communication with American and other dentists abroad, and with our own government and its officers, in relation to the condition of the American degree in foreign countries, it has been deemed best, at the suggestion of such correspondents, to furnish our dental journals with abstracts from a few of these communications, that the profession in America may be made aware of the consequences resulting from the vicious character of some of the Illinois legislation. The first instalment of this was furnished without comment to the principal journals for their April issues, and the following is in supplement to that. The committee is necessarily dependent upon our professional magazines

for this courtesy, and it is glad to say that all have expressed a hearty willingness to aid in the good work to the extent of their power.

W. C. BARRETT, *Chairman*.

(Copy.)

UNITED STATES CONSULATE, MUNICH, February 25, 1901.

DR. W. C. BARRETT, Chairman Foreign Relations Committee, National Association Dental Colleges:

Esteemed Sir,—I have the honor to acknowledge your letter of the 9th inst. The work undertaken by me is to bring me no other reward than the restoration to honor and acceptance everywhere of the American degree in dentistry, than which no other country merits it better.

The report of the committee you sent I had read ere I prepared my last despatch sent to the government at home and here, and in my recent despatch mailed last week to Washington I supplied evidence against one of the supposed *suppressed* institutions, the old "Academia Illinois," the diploma dating from May 24, 1899, although obtained much later and issued by Dr. B. E. Winther and Dr. B. I. R. Ungelenk. Of the diploma, as well as the notary's certificate (which is *printed*, as you will see, so that the notary only had to write in his own name), I hand you photographic copy herewith for further use. The whole case will of course be duly reported to you from Washington, and I think will undeceive you as to all parties of the nefarious traffic being in jail.

You will oblige me if you will kindly state the names of all the parties thus far arrested, and promptly have me informed of any new ones added to those jailed, as it is all-important that we have these names registered here.

Very respectfully,

(Signed) JAMES H. WORMAN, *Consul*.

Inclosures:

1. Copy of diploma of Academia Illinois to Bosch. Signed, Dr. B. E. Winkler, Pres., Prof. Op. Dent.; B. I. R. Ungelenk, Sec., Prof. of Chem.
2. Kreuker's certificate as notary.
3. Copy of letter from the police here.

CONSULAR SERVICE, U. S. A., MUNICH, GERMANY, February 12, 1901.

DR. W. C. BARRETT, 208 Franklin st., Buffalo, N. Y.:

Dear Sir,—Just now a very peculiar case is up here and I am anxious to have your assistance at once. Under this date I write to the State Board of Illinois as per inclosed, also to the secretary of the Board of Health of Illinois, addressing him at Springfield, and requesting two copies of the annual report or of the law as amended for examinations by the State Board to be certified to by the Secretary of State and the German consul. This is all-important.

This Gumpoldt has no Roumanian degree, and was in the United States only a few weeks, possibly only a few days. I know when he went and returned. He has a diploma from Weil and two certificates from the State Examining Board, as my letter to Reid discloses, both referring in date and contents, Weil having been the interpreter. Our German consul in Chicago has notified the courts here that the Illinois Board is competent to grant such certificates, and that signature of three makes it a *bona fide* certificate. The law requires annual meeting for the granting of licenses. Members of board can only grant temporary certificates, renewal necessary, and registration in county clerk's office within six months,—all of which was *not* done.

Yours truly,

(Signed)

J. H. WORMAN, *Consul*.

No. 48.

CONSULATE OF THE UNITED STATES OF AMERICA,

MUNICH, GERMANY, February 13, 1901.

HON. DAVID J. HILL, Assistant Secretary of State, Washington, D. C.:

Sir,—Most respectfully referring to my despatch No. 38 under date of December 29, 1900, regarding the sale of dental degrees in Germany, and to the

preceding communications from this consulate to your department on the same subject, I have the honor to report further: . . . [The first part of this despatch of Consul Worman, of Munich, consists of a review of what has been previously reported concerning the "Academia Illinois," of Chicago, and the "Wisconsin College of Dentistry" of Milwaukee, both of which have been suppressed, and of extracts from the report of the Foreign Relations Committee made at Omaha, July, 1899, in which the enormity of the foreign diploma traffic on the part of certain Chicago institutions was fully set forth. This is omitted as having been substantially published before.]

The German dental journals have exposed and denounced the swindling institutions fraudulently issuing diplomas, but so indifferent are the German authorities to protect the dignity of American degrees that it is difficult to enlist them for prosecution that will restore American dental honors to the distinction to which they are entitled.

In 1897 the *Journal für Zahnheilkunde*, XII Jahrgang, No. 42, reviewed a prospectus of the Academia Illinois, which they had secured from Chicago, and thoroughly exposed its illegal business and the worthlessness of its diplomas. (A copy of this article and a translation are hereto annexed, marked Exhibits J and K. An exhibit to the same purpose, marked L, from the *Zahnärztliche Rundschau*, Berlin, July 15, 1900, p. 6860, is also hereto annexed. A translation of the same is marked Exhibit L 1.)

To what low estate American university training and honors have fallen in Germany on account of this disgraceful traffic is perhaps better apparent from these technical journals than from the manner in which the subject is treated by the secular press, and even by the comic journals.

Can any American of spirit sit idly by and see such disgraceful caricatures launched against educational enterprises,—and that with justification, by reason of such want of supervision on the part of so great and cultivated a state as Illinois, whose chief city, where this nefarious traffic centers, has a reputation to lose, as well as to make, second only to the metropolis of our great country? (A cartoon from the *Lustige Blätter* showing a penny-in-the-slot diploma machine is hereto annexed, marked Exhibit M.)

This publicity has not always treated of the swindling institutions alone, but has very often generalized the whole subject, not only of American dental degrees, but all American educational honors, and has created in the minds even of educated Germans a prejudice against our institutions of learning which is as unfortunate as unjust, and is proving and will prove still more in the future detrimental to American practitioners in Germany, and probably lead ultimately to the exclusion of American degrees in South Germany, like as in the north, where their holders are practically denied the right to use or practice under them. (See Exhibits K 1 and K 2.)

The courts of North Germany have had until recently much more to do with this question than those of the Southland, and the manner in which they have commented upon our educational institutions, though largely due to want of understanding of the organization of these schools, has nevertheless reflected the general unfavorable opinions entertained here. Such expressions of eminent men could have but helped to strengthen and confirm the prejudices of those of lower estate.

It is simply a question of time, and that not so far away, when the courts of the Southland will re-echo these same unjust sentiments, if the flood-tide of public opinion is not promptly stemmed by discriminate and effective legislation at home. It will not do for the legislators of the state that has brought such disgrace upon our common country and good name to plead impairment of interests which have become incidentally vested under vicious legislation as a reason why no more effective measures have prevailed against the nefarious traffic and its disgraceful results.

The statement of Dr. W. C. Barrett, chairman of the Foreign Relations Committee of the National Association of Dental Faculties (see Exhibit 1½) that thus far the National Association of Dental Faculties has failed to carry through such legislation as the conditions exact, is best supported by citation of court reports here.

A very recent expression from the criminal court of Breslau, although restricted to the "Academia Illinois," no doubt influenced a judgment ren-

dered by the District Court of Nuremburg, and caused a most indiscriminate and wholly unwarranted denunciation of the "Chicago College of Dental Surgery," one of the most reputable of American schools. (A copy of this decision and translation thereof are hereto annexed, marked Exhibits M 1 and M 2.)

The judgment in Breslau was given in July, 1900, and probably the charter of the "Academia Illinois" had been revoked, but the court did not seem to care to discriminate between extinct and existing institutions.

An English rendering of the decision is as follows: [. . . .] The professors of the "Academia Illinois" were tradespeople, policemen, etc., who did a flourishing business by trafficking in diplomas in all professions, and sent their swindling advertisements to dentists abroad, unfortunately not always without success. One of the deans of these institutions was one Abert, sentenced to the penitentiary in Breslau, escaped to America, and was there forced to undergo a prolonged treatment in a penitential "water cure."

What the Committee on Foreign Relations of the National Association of Dental Faculties said as far back as 1898, at Omaha, surely goes to the root of the matter. Their report expressed the earnest hope "that as soon as the professional men of the state of Illinois are aroused from their lethargy and made to comprehend the enormity of the conditions, they will present the matter before the Legislature in its proper light, and the disgraceful law will be so amended that it will not apply to educational institutions, and the charters already issued under it will be very promptly canceled."

It is evident from what has been heretofore said that this good work has not yet been accomplished. As here truly said, however, the remedy lies at home, and I hope at a very early day to most respectfully submit some suggestions that will be practical as to procedure in Illinois, obtained as the result of the criminal trials and investigations by the Attorney-General's Office here; and perhaps also regarding diplomatic representations that seem to be called for to put an end to the prejudicial part taken in some of the cases by the Imperial German consul in Chicago, or his subordinates in his name.

I have the honor to be, sir, your obedient servant,

(Signed) JAMES H. WORMAN, *United States Consul.*

Exhibit.

(Translation.)

TO THE CHIEF OF POLICE:

MUNICH, December 17, 1900.

In the matter of Franz Xaver Bosch, for using here the title of Doctor of Dental Surgery.

In reply to your letter of the 24th ultimo, I beg leave to state that the "Academia Illinois" still has the right to issue dental diplomas, but is known to have abused such privileges and will not be permitted to exercise the privilege much longer.

The issuing of such diplomas is only permitted when the applicant has pursued a regular course of study of several years, and has passed a formal examination.

Even under the most favorable circumstances, a thoroughly qualified candidate would not be admitted to examination at one of our reputable dental colleges unless he had pursued his studies there for at least six months. According to the new regulations the candidate is admitted to examination only after eighteen months of study in the college where he wishes to graduate.

The institution in question is said to have issued diplomas to applicants, on payment of a certain sum of money, who have not complied with these preliminary requirements, as has been proved at the trial of Emil Gumpoldt, in the Criminal Court No. 2, at Munich, on December 10, 1900.

The holders of diplomas like the one issued to Bosch cannot even practice in America.

Such diplomas are mainly used abroad to deceive a public unable to discriminate between such and those approved by the United States Commissioner of Education.

The American government is assiduously striving to suppress these spurious institutions.

There are only two still in existence,—viz,

1. The Cosmopolitan Post-graduate College of Dental Surgery at Chicago; and

2. The German-American Dental College, also at Chicago.

I, therefore, respectfully request you to have the diploma in question confiscated and transmitted to me, and vouch for its return. I desire to send it to the United States Commissioner of Education in order to furnish official evidence that such a spurious diploma was issued by the said institution. The Commissioner of Education would then be in a position to pronounce on the illegality of the diploma, and to take steps to suppress the institution.

The anticipated reply of the State Department will be given without delay, since I have already called its attention to these swindling institutions, and have had not only its approbation of my action in the matter, but have been instructed to co-operate in the settlement of this affair with the government here.

I have the honor to be, sir, your obedient servant,

(Signed) JAMES H. WORMAN, *United States Consul.*

[Here follows, as Exhibit I, a copy of an article from the DENTAL COSMOS of July, 1900, p. 700, vol. xlii, under the title, "A Slump in the Diploma Traffic."]

Exhibit.

(Translation.)

(From the *Journal für Zahnheilkunde*, xii, No. 42, 1897.)

A CHAPTER ABOUT DOCTORS OF DENTAL SURGERY.—For some time past eulogies of the latest swindling institution, the "Academia Illinois," have been circulating in Germany. To-day accident has thrown into our hands a prospectus of this "institute." The swindling intent is so apparent in this circular that he must indeed be dumb who could fall into its hands. At the same time we have received information from Chicago that the postmaster there has been instructed not to deliver letters and money remittances addressed to the "Academia Illinois," but to send them to the Dead-Letter Office in Washington to be returned to the writers and senders, as according to American law the mails cannot be used for fraudulent purposes. To avoid this prohibition this worthy crowd has pasted over the address of the "Academia Illinois" on the circular, and given the address of a boarding-house lodger who has no actual residence there to enable them to continue the swindle and enhance the difficulties of the prosecution.

In order to escape the effect of the law of April 7, 1897, regarding the necessity in Prussia of ministerial permission to use a foreign doctor's degree, the president, whose signature appears on the circular has the audacity to assume that this "rag" which he calls a diploma would be acknowledged in Prussia. (He calls himself in the circular "Magnificenz" and "Rector Magnificus.")

We have on the part of our society sent properly certified copies of this circular as well as the information received from Chicago about this swindling concern, to all proper officials, to place a bar to the use of this diploma which the notorially certified documents from Chicago cannot and will not break through.

In the circular the president calls himself "Magnificenz," and names among the "Founder" four victims, three in Germany and one in Brussels. We hope that these pilloried gentlemen will soon find out that they themselves have been swindled and will not lend themselves to the stool-pigeon service which is attributed to them in the circular.

(From the *Neuesten Nachrichten*, Munich, February 6, 1901.)

THE RIGHT TO THE TITLE "AMERICAN DENTIST."—The dentist Emil Gumpoldt, who acquired the title of "American dentist" in America, advertised as such in several newspapers, and had a sign made bearing that title. December 10 of last year Gumpoldt had to appear in court to account for the title which he had no right to claim, and was sentenced to five days' arrest or a fine of \$12.50.

The court of justice has taken the matter in hand, and the American consul, Mr. J. H. Worman, was present at the transaction, as witness and

competent judge. Mr. Worman asserts that the certificate which Gumpoldt received (from the Illinois State Board of Dental Examiners), and which he claims entitles him to "American dentist" is not genuine, as it should be signed by a board of examiners of five members. Gumpoldt's certificate shows but three signatures, and is therefore only provisory or not valid. If the certificate were genuine and signed by the full number of censors it would pass for a "license of trade," and only entitle the holder to practice in the state of Illinois (where it was issued). The certificate bears the signature of the German consul at Chicago—not as a competent judge, however, but to confirm that the wording of the German copy is genuine. A diploma such as Gumpoldt pretends to possess Mr. Worman considers a fraud of individuals whose principal aim it is to rob foreigners, and Gumpoldt claims to have become their victim, and his case should serve as a precedent to his colleagues.

The consul states that such diplomas cannot be granted by law unless the student has lived in America a certain length of time, and has passed through a course of studies. Mr. Worman considers it his duty to oppose such frauds and has taken steps to insure the punishment of such swindlers by his government.

The testimony taken showed that Gumpoldt arrived in the city of Chicago in the spring of 1900, obtained a diploma and the degree of Doctor of Dental Surgery from the "Cosmopolitan Post-graduate Medical College," was admitted to and passed the examination of the "Illinois State Board of Dental Examiners," received a license to practice in the state of Illinois, and returned to Germany, leaving Munich after the middle of April and arriving back again early in June of the same year, having been gone but little more than four weeks. He had never previously pursued any course of dental study.

Exhibit.

(From the *Zahnärztliche Rundschau*, Berlin, July 15, 1900.)

AMERICAN DOCTOR'S DIPLOMAS.—By Dr. A. E. Miller, of Chicago.—The European and more especially the German dental press has within the last few years taken up the question of American diplomas, and so much has been written about it, without giving any accurate statement of the conditions prevailing in America, that I am prompted to give an impartial elucidation of American college institutions.

The writer, after graduating from a high school, attended the universities of Berlin and Leipzig, and was as student and teacher connected with colleges here, and may, therefore, be considered a competent judge.

The so-called dental colleges, dental schools, etc., are as a rule private enterprises, and according to the will of the Legislature are not founded in the interest of science and humanity without yielding pecuniary profit to the managers. The words "incorporated under the laws of the state" do not mean that the institutions are state institutions, but that they have been founded like insurance companies, large hardware concerns, liquor enterprises, etc. Therefore the doctor's degrees of the college here are not to be confounded with the state diplomas in Germany, but would rank with the apprentice certificates of any of the above-mentioned business concerns. There is this difference, however: While the state, in the exercise of the police power, does not concern itself as to whether apprentice certificates of hardware concerns are based on truth, and does not vouch for the qualification of their holders, it manifests an interest in those young people who have received a doctor's diploma and are desirous of practicing dentistry, to see that their diplomas do practically guarantee the qualification of the holders. Therefore there is in every state a "State Board of Dental Examiners," whose duty it is, in the interest of public health, to see that no unqualified persons are admitted to practice dentistry. This is carried out by subjecting all candidates to an examination, no matter whether they have attended a college or not. From this examination are exempt only such as are in possession of a doctor's diploma from institutions whose reputation warrants a thorough qualification of the respective holders of diplomas, and who have obtained their licences to pursue the practice of dentistry by virtue of their diplomas.

IMPERIAL GERMAN CONSULATE, CHICAGO, June 28, 1899.

In regard to your letter of the 11th, of this year, I write to state that the Cosmopolitan Post-graduate College is permitted by law to give the degree of doctor (D.D.S.), after passing examinations. The course lasts eleven to thirteen weeks, and is not arranged in classes. The directors of the college, Dr. Weil and others, have a good reputation as far as I know.

If the degree given in this college has the same value as those given in other colleges I am not prepared to say. I have neither means nor opportunities to investigate the many institutions which exist in this country, and which are not under our control.

Concerning the value of American doctor diplomas in Germany you can best be informed in Berlin.

The Imperial Consul,

(Signed)

F. A. LETTENBAM.

(From the *Basel Vorwärts* of March 12, 1901.)

The Doctor Factory in Philadelphia which, as is well known, on the payment of several hundred dollars, helps every one to a doctor title, is now so crowded with work that, to furnish the paper for doctor diplomas, eight large paper factories are working day and night uninterruptedly. And even then thousands of aspirants for the doctor title must be turned away daily or put off to future years. Among the applicants for the coveted title are numerous ladies; the modern American lady knows no higher ambition (or has no higher pride) than to place Dr. before her name.

DRESDEN, January 30, 1901.

PROF. DR. BARRETT:

Honored Professor,—The Society of Graduate Dentists in Dresden send you a copy of one of the Cosmopolitan Post-graduate College diplomas. With this diploma the graduates of that institution receive the title of doctor (D.D.S.). The Society of Post-graduate Dentists in Dresden consider this title worthless. We beg, dear doctor, that you explain to the German consulate at Chicago the value of this college, that they may send us an official statement of its worthlessness, as speedily as possible, and that we may deal justly with the consulate. The Foreign Relations Committee has already been notified.

In one of your letters to Dr. Miller, of Berlin, were some very interesting facts about the Cosmopolitan College. We hope it is possible for you to obtain the official statement for us, and that the college, about which we have no doubt, has been closed by the law, and that the director of the college will meet his reward.

It will then be an easy matter to persuade the Ministerium in Saxony of the worthlessness of the college and to obtain the punishment of these gentlemen.

Believe me, with very great respect, and the compliments of the Society of Graduate Dentists of Dresden.

(Signed)

BOENHERR.

(Translation.)

DRESDEN, January 14, 1901.

DR. W. C. BARRETT:

Dear Professor,—Your kind letter and report of the Foreign Relations Committee were received a short time ago. Allow me to thank you most sincerely for having sent the explicit account to our colleague, Dr. Boenherr. Our association has carefully weighed and considered the letter and is confident we are now able to take a further step in doing away with the diploma-swindler in Germany, as well as to unmask the bearers of the false title of "Cosmopolitan Post-graduate College of Chicago."

It is difficult to understand how it was possible that the Ministerium should acknowledge the title after the very superficial examination, and moreover how it could be permitted that the bearer of this diploma could make use of the same. Thanks for the excellent proof that we now have, owing to our colleagues, we sincerely hope that we shall be able to convince the officials

of the falseness of the title and thereby do away with this swindle, especially since it is of vital interest to the whole dental world.

As soon as this matter is settled we shall not fail to send you and all our colleagues in America an accurate report. So far we have not yet secured the official certificate of the German Imperial consulate of Chicago, by aid of which we can readily overcome all difficulties. Although we made known to the consulate of Chicago about nine months ago the facts concerning the existing condition of the "Cosmopolitan College," we received an evasive rather than an explanatory answer. This made us consider the matter seriously if not suspiciously,—in fact, to such an extent that we may report the deficiency to the Chancellor's office in Berlin.

It seems impossible that the consulate should be ignorant of the worthlessness of the said college, when you, as well as Dr. Brophy, Dr. Kirk, and Professors Miller and Hesse, of Germany, have given us such definite information. We have also reports from the following sources: DENTAL COSMOS, March, 1899, p. 287. *Items of Interest*, No. 7, July, 1899. Can you in any way explain why the German consulate of Chicago gave us such unsatisfactory answers?

You would confer a great favor on us by giving us an official document about the "School of the Cosmopolitan Post-graduate College." Of course we shall pay all expenses in connection with this.

Sincerely yours,

(Signed) C. BLOCHMAN,
Society of Graduate Dentists of Dresden.

DR. W. C. BARRETT, Chairman:

Dear Professor,—Your kindness requires especial thanks. I hope that your explicit document will make an impression upon the ministerial offices.

It may be of interest to you to know that the Saxon Minister received a favorable report from the German consul regarding the questionable college, and said consul at Chicago is therefore not free from complicity. We must therefore be under great obligations if you could obtain a proper document from the general consul in Chicago, telling us of the quality of said college.

Yours,

(Signed) YOENKEN, D.D.S.

Exhibit.

MUNICH, January 5, 1901.

DR. J. G. REID, Chicago, Ill.:

Esteemed Sir,—I am informed that you are president of the Illinois State Board of Dental Examiners.

(1) Will you as such kindly inform me whether candidates for the practice of dentistry in your state are not obliged to have pursued a course of study for at least a short period in some school of dentistry before being admitted to examination before your board?

(2) Kindly reply how it comes that certificates are issuing with Dr. Smyser as secretary and Dr. Jocelyn as president of your Board of Examiners?

(3) Are certificates complete and legal if issued without the signature of yourself or of Dr. Pitner, if issued September, 1900?

An early reply is most respectfully requested.

Very truly yours,

JAMES H. WORMAN, *United States Consul.*

Exhibit.

STATE BOARD OF DENTAL EXAMINERS, CHICAGO, January 22, 1901.

JAMES H. WORMAN, *United States Consul, Munich, Germany:*

Honored Sir,—Your letter of January 5, addressed to me as president of the Illinois State Board of Dental Examiners was duly received. While I am not the president of the board, I am its secretary, and such correspondence is usually delegated to such officer to answer.

(1) Candidates for examination do not have to present credentials of any kind to be admitted before the board. Any one who may desire can come

before the board, irrespective of how much or how little knowledge he may possess on dental subjects. The board determines his qualifications after the examination.

(2) Licenses bearing the signatures of only three members of the board can only be explained on the ground that the former secretary did not send the license to Dr. Pitner or myself for signing, and the majority of licenses abroad would not have been signed by us any way, especially those issued during the past two years.

(3) To my knowledge the courts of this state have never passed upon the question of the requisite number of names that shall appear on the document to make it legal. From what we see, one is led to suppose that three names are sufficient to make it legal. The law says in plain that the license shall be signed by the members thereof. So long as I remain secretary of the board no license will appear in your country without the required number of names.

There are times when the board might be vacant for some time. There are times when a member of the board could not be reached, hence his signature could not be obtained, but these are only exceptional cases, and not general.

I inclose you with this letter a copy of the law, that you may familiarize yourself.

Any further information you may desire I will gladly furnish if within my power.

Very respectfully yours,

J. G. REID, D.D.S., *Secretary.*

UNITED STATES CONSULATE, MUNICH, GERMANY, February 7, 1901.

DR. J. G. REID, Secretary Illinois State Board of Dental Examiners, 1006 Champlain Building, Chicago, Ill., U. S. A.:

Dear Sir,—Please accept my thanks for your prompt answer, and your kind explanations, as well as for the inclosure with your favor of 22d January. Kindly favor me with two new copies of same. May I now hope to have your answer to the following queries:

(1) Why was one Emil Gumpoldt granted a license to practice dentistry in Illinois under date of May 5, 1900?

(2) Why was the paper signed by only three members, and why was a new issue of this certificate made in September?

(3) What evidence of fitness did he furnish for such licensing, and why do the two certificates differ in contents?

(4) Have these certificates any value so long as they were not filed in the county clerk's office within six months?

(5) How came it that Dr. Weil, himself interested in "graduating" students in dentistry and the head of a suspected institution and excluded from the list of reputable colleges, was permitted to conduct the examination of said Gumpoldt, or at least to assist as an interpreter?

(6) Are the examination papers of this candidate on file at your office? Also his diploma?

Kindly give me answer by return post, and oblige

Yours truly,

(Signed)

J. H. WORMAN.

OBITUARY.

SIR EDWIN SAUNDERS.

SIR EDWIN SAUNDERS, F.R.C.S., died March 15, at the advanced age of eighty-seven. For a considerable number of years he had relinquished practice, and had enjoyed many years of leisure at his residence on Wimbledon Common, where he had a beautiful garden and had attained great success in chrysanthemum culture. But until a comparatively short time ago he had retained his connection with the dental profession, acting as trustee to sev-

eral of its institutions, a position for which his business aptitude made him especially valuable.

In his early days he showed some bent toward mechanics, and invented several things which, although they failed to come into general use, indicated ingenuity and capacity in that direction. Turning to dentistry as a means of livelihood, he became apprenticed to the late Mr. Lemale, and started in practice on the Surrey side of the Thames without any qualification, as was at that time not unusual. Having attracted the attention of one of the surgeons of St. Thomas's Hospital, it was suggested that he should lecture on his own subject there, but his appointment necessitated his obtaining a medical qualification.

In 1839 he became a member of the College of Surgeons, and was appointed dental surgeon to and lecturer at St. Thomas's Hospital, a post which he held for a good many years. He removed to the West End, and there became acquainted with Mr. Nasmyth, who at that time held the court appointment. Mr. Nasmyth having had an attack of hemiplegia, Mr. Saunders took charge of his practice and finally purchased it, with the house in George Street, where he remained throughout his professional career. Shortly afterward, in 1846, he obtained the court appointment, and was surgeon-dentist to the late Queen from that time until the death of Her Majesty. From the time of his association with Mr. Nasmyth he carried on a very large and remunerative practice, in the course of which he was brought into contact with many notable personages, and had some curious experiences. He was president of the Dental Section at the International Medical Congress in 1882, was twice president of the Odontological Society, and in 1881 was president of the Metropolitan Branch of the British Medical Association. In 1883 he received the honor of knighthood from Her Majesty.

To the literature of his profession he contributed little; indeed, his only noteworthy contribution was a pamphlet entitled "The Teeth a Test of Age," which was issued about 1840, and was suggested by the frequent evasion of the factory acts. Though based upon what would nowadays be thought an insufficient number of cases, its general conclusions have not been materially invalidated, and it was a useful addition to knowledge in its day.

To dental education and to the general advancement of his profession he was ever a warm friend, and as early as 1840, in conjunction with Mr. Harrison and Mr. Snell, well-known dentists at that time, he worked a sort of dental dispensary for six years, after which it was abandoned as too great a tax upon time and energy. Subsequently, although not the actual initiator of the more important steps taken toward the advancement of the dental profession, he was always associated with them, and his influence was invariably exerted upon the right side. Thus he took part in memorializing the College of Surgeons to institute their dental diploma, and the meeting at which the Odontological Society was instituted was held at his house. He was also concerned in the foundation of the Dental Hospital, which had become a necessity for providing the dental student with an adequate training, which up to that time he had had to acquire in a haphazard fashion as a private pupil. This was started on a small scale in Soho Square, and when it had overgrown the accommodation there available, it was Sir Edwin Saunders who found for it a new site in Leicester Square, and by his business aptitude and generous pecuniary help rendered possible the acquisition of the freehold. Later, further extension being desirable, but the hospital not being

in a position to expend more money, he himself purchased the adjoining house, partly rebuilt it, and finally presented it to the hospital—a munificent gift. Thus the financial prosperity of the old hospital was in no small degree due to his great liberality. As some recognition of his services to the institution, he was presented by his friends with his portrait, which is now in its council room, and with a sum of money to found a scholarship which should perpetuate his name in association with the school. But the hospital and school again outgrew the possibilities of their premises, and it is strange that the same week saw the opening of the new hospital, replete with every modern convenience, and the death of its most munificent patron.

Until advancing years rendered it necessary that he should live a quiet life he was distinguished for his hospitality, and was enabled by the wide extension of his circle of friends to secure for the Dental Hospital the interest of influential persons who might otherwise have passed it by.

He was the first dental surgeon to receive the honor of knighthood, and the first to occupy a position of special distinction in the British Medical Association. As a recognized head of his profession, his death will leave a great gap, the more so as he was one of the last survivors of the band who worked so successfully for the placing of their profession upon a more satisfactory basis.

His funeral, which took place at Putney on March 20, was largely attended by members of the medical and dental professions.—*Brit. Med. Jour.*

DR. G. VARGAS PAREDES.

DIED, at Bogota, Colombia, S. A., May 7, 1900, Dr. G. VARGAS PAREDES.

Dr. Paredes graduated from the New York College of Dentistry, February 25, 1879, and because of his special qualifications was immediately afterward appointed demonstrator of operative dentistry in the same institution. He became proficient in both phases of dental art, as a result of his constant application and his enthusiasm as a worker.

On his return to his native city he rapidly acquired an extensive practice, and in 1888 he founded, at Bogota, the first dental college in Colombia; of this institution he was made the dean. In collaboration with a well-selected faculty his efforts were crowned with success, which has increased yearly. In 1896 he made an extensive tour both in Europe and America for the purpose of studying dental educational institutions, and the results of his observations were in a large measure introduced into the school of which he was the head, with a view to its improvement. For the purpose of facilitating his teaching work he wrote a text-book, entitled "Studios Dentales," in which he incorporated in a condensed form the best selected methods and theories of his own and other authors, most of them American.

As a teacher he was explicit and clear in the presentation of his theme. In his intercourse with students his manner was affable, although he was a rigid disciplinarian. His work has done much to establish dental education and to improve the condition of dental practitioners in his own country. He leaves a wife and one son. Notice of his untimely decease has been delayed, owing to the disturbed political conditions prevailing in Colombia, which have interfered with the transmission of the mails.

DR. THEODORE FRANCIS CHUPEIN.

DR. CHUPEIN was born September 7, 1830, in Charleston, S. C., where he received his education and where he lived until 1876. At the age of seventeen years he was placed by his father with Dr. Wm. S. Monefelt for the study of dentistry. Remaining with his tutor from the year 1847 until 1852, he was principally engaged in the laboratory and doing all the artificial work of his preceptor. In 1852 he commenced practice for himself, but his father dying the year after, his practice was interrupted for two years.

With Dr. J. B. Patrick and W. S. Brown, of Charleston, and Dr. Wm. Reynolds, of Columbia, S. C., Dr. Chupein was an active spirit in the formation of the South Carolina State Dental Association, and was selected its first secretary, and afterwards its president. He was almost wholly instrumental in the establishment of the Charleston Dental Association, being a leader in this organization and giving all his efforts to its advancement.

He devoted all his time with little intermission to his profession, with the exception of the duration of the war, when he served in the Confederate army. Even then he practiced dentistry, for being for a year or more on garrison duty, he brought his case of instruments into camp and filled teeth for the officers and men. He has related that at this time being out of gold foil he purchased an ounce of this from Messrs. Brown & Hape, of Atlanta, Ga., and paid them *fifteen hundred dollars* for it.

At the close of the war he came to Philadelphia and obtained employment with Dr. J. D. White, with whom he remained until 1866, when he returned to Charleston, S. C., and recommenced the practice of dentistry.

In 1872 he came north and was graduated from the Pennsylvania College of Dental Surgery, after which he again returned to Charleston. In the latter part of 1875 a disastrous fire so crippled him by the destruction of his office, instruments, library, and a dental depot which he had established, that early in the following year he moved with his family to Philadelphia, and opened his office at 1408 Pine street.

Shortly after his arrival in Philadelphia, he became a member of the Pennsylvania Association of Dental Surgeons, and in 1877 he was elected its secretary, which office he has held continuously since. He also connected himself with his old alma mater, the Pennsylvania College of Dental Surgery, and occupied the position of one of its clinical instructors. He was a member of the Odontographic Society, the Odontological Society of Pennsylvania, and was made an honorary member of the Academy of Stomatology.

For some years he undertook the section of the "Practical Place" in the old series of the *Dental Office and Laboratory*, and in 1887 he assumed the editorial department of the new series of the journal, which he filled up to the time of his death. He was also a contributor to the *American System of Dentistry*, edited by Professor W. F. Litch.

He took an active part in the celebration of what was termed the "golden anniversary" of the Pennsylvania Association of Dental Surgeons, which was the commemoration of the fiftieth anniversary of the organization of that society and the inception of dental education in Pennsylvania,—an event celebrated December 16, 1895, by a banquet at the Continental Hotel.

He was married, in 1858, to Virginia M. Pohl, of Philadelphia. He had six children. His widow and three children survive him.

Dr. Chupein's personality was one which made for him many and warm friendships. Gentle and kindly in spirit, yet firm in the expression of his

convictions, he seldom if ever roused antagonisms, certainly never those which strained his personal relationships with his colleagues. He was an earnest lover of his profession, an enthusiastic supporter of its dignity, and an active coadjutor in every movement tending toward its advancement. He was a close student of the details of his art, and his knowledge of that department of his calling was broadly based on a long and varied experience which made him not only a resourceful practitioner, but a helpful teacher to all who sought his instruction.

Age and declining health had recently placed their limitations upon his activities, but all who knew him, either personally or through his contributions to our literature, will mourn the loss of a true friend and a faithful, enthusiastic, and trustworthy exponent of dental art.

DR. A. E. WALES.

DIED, September 14, 1900, at Rocky Hill, Conn., of interstitial nephritis, DR. ARTHUR E. WALES, of New Britain, Conn.

Dr. Arthur E. Wales was born in Windsor, Vt., June 20, 1864. After a dental pupilage of about three years with Dr. R. C. Dunham, of New Britain, he studied for one term at the New York Dental College, and later at the Philadelphia Dental College. He was graduated from the latter institution in 1886, and entered dental practice in New Britain the same year. He was a member of the Connecticut State Dental Association, the Hartford Dental Society, and the Northeastern Dental Association.

DR. CLARENCE V. ROSSER.

DIED, March 2, 1901, at his home in Atlanta, Ga., CLARENCE V. ROSSER, D.D.S., in his fortieth year.

Dr. Rosser was born in Randolph county, Ga., September, 1862, where he received an academic education. He graduated from the dental department of the Vanderbilt University in 1885, and occupied the position of demonstrator in that college for two years. He then established himself in practice in Elizabethtown, Ky., where he continued until 1890, when he moved to Atlanta. He was elected dean of the dental department of the Southern Medical College in 1896, and president of the Georgia State Dental Society in 1899.

In 1894 he married Miss Elizabeth Hays, of Elizabethtown, Ky., who survives him.

DR. CHARLES SHIRAS SCOTT.

DIED, January 6, 1901, at his home in Pittsburg, Dr. CHARLES SHIRAS SCOTT, in his fifty-eighth year.

Dr. Scott was the son of Dr. John Scott, who established the first dental house in Western Pennsylvania, and who practiced in Pittsburg for more than fifty years. He was born July 17, 1843. His early education was obtained at a private school, and at the age of eighteen he graduated from the Western University. Almost immediately after graduation he enlisted in the army, and he served until the close of the war.

Upon his return from the army he entered his father's office, and after a time began to practice with him. In 1881 he married Miss Mary McClosky, who, with two sons, survives him.

DR. HENRY J. MCKELLOPS.

ANNOUNCEMENT of the death of this widely-known practitioner, which took place in St. Louis, April 23d, has reached this office too late for more than this brief notice in the present issue.

DENTAL LEGISLATION.

NEW JERSEY STATE DENTAL LAW AMENDMENT ACT, APPROVED
MARCH 22, 1901.

[SENATE, NO. 190—STATE OF NEW JERSEY.]

AN ACT to amend an act entitled "*An act to regulate the practice of dentistry in the state of New Jersey, and to repeal certain acts now relating to the same,*" approved March 17, 1898.

BE IT ENACTED by the Senate and General Assembly of the state of New Jersey:

1. Section two of the act referred to in the title of this act be and the same is hereby amended so as to read as follows:

2. The members and officers of the State Board of Registration and Examination in Dentistry, as now constituted pursuant to chapter one hundred and forty-three of the laws of eighteen hundred and ninety, may continue to hold office until the expiration of their terms, unless previously removed; the New Jersey State Dental Society shall, at each of its annual meetings, recommend to the Governor for appointment as a member of said board a dentist of good repute, residing and practicing in this state, whom the Governor shall appoint; the member so appointed shall hold office for five years, or until his successor is appointed; the Governor shall also fill, for the unexpired term only, vacancies occurring in the board by reason of death, resignation or otherwise; cause being shown before him, he may remove a member from office upon proven charges of inefficiency, incompetency, immorality or professional misconduct; the board shall, at its annual meeting, elect from its members a president and secretary; it shall hold at least two meetings annually for examining and licensing persons to practice dentistry in this state, at which meetings three members shall constitute a quorum; said board shall have the power to determine the good standing and repute of any dental school, college or department of a university, and may from time to time designate in some public manner schools, colleges or departments of universities whose diplomas will be received by it; it shall annually make a report of its proceedings to the Governor and to the New Jersey State Dental Society; the seal heretofore adopted by it shall continue to be the common seal of the board; it may sue or be sued, and in all actions brought by or against it, the board shall be designated as "The State Board of Registration and Examination in Dentistry."

2. Section six of said act is hereby amended to read as follows:

6. Said board shall register as licensed dentists, and under its seal and the hand of its president and secretary, issue to all persons who shall successfully pass said examination, its license to practice dentistry in this state; the board may also, without the examination hereinabove provided for, issue its license to any applicant therefor who shall furnish proof satisfactory to it that he has been duly licensed after examination to practice dentistry in any state after full compliance with the require-

ments of its dental laws; *provided, however*, that his professional education shall not be less than that required in this state; every license so given shall state upon its face the grounds upon which it is granted, and the applicant may be required to furnish his proof upon affidavit; the fee for such license shall be twenty-five dollars.

3. Section eight of said act is hereby amended to read as follows:

8. This act shall not be construed to prohibit an unlicensed person from performing mechanical work upon inert matter in a dental office or laboratory; or to prohibit the registered student of a licensed dentist from assisting his preceptor in dental operations while in his presence and under his direct and immediate personal supervision; or to prohibit a duly licensed physician from treating the diseases of the mouth or performing operations in oral surgery; nothing in the provisions of this act shall be construed to permit the performance of dental operations by any unlicensed person under cover of the name of a registered practitioner; any person now registered as a student may present himself for examination to the board upon complying with the provisions of this act relative to examination, and presenting to the board a certificate, under oath from the dentist or dentists with whom he has studied, that such applicant has studied as a student with the dentist or dentists so certifying for not less than five years continuously; *provided, however*, such applicant shall have filed, on or before the first day of June, eighteen hundred and ninety-eight, a notice with the board that it is his purpose to avail himself of the exemption hereby made; the board may, however, at any time, upon proof of the violation of any of the provisions of this act by such student, revoke his right to present himself for and pass such examination; any person shall be regarded as practicing dentistry within the meaning of this act who shall use the words "doctor of dental surgery," "doctor of dental medicine," or the letters "D.D.S." or "D.M.D." in connection with his or her name, or any other title intended to imply or designate him or her as a practitioner in dentistry in all of its branches, and who, in connection with such title or titles, or without the use of such titles, shall practice dentistry in any of its branches; *and it is further provided*, that he use of any one of the aforementioned titles or the exposition of a sign, circular, advertisement or any other device or information indicating thereby the occupation of the person or persons, shall be taken and considered in the trial of any indictment which may be found for the violation of any of the provisions of this act, or in the trial of any civil action for penalties under the provisions of this act, as *prima facie* evidence.

4. This act shall take effect immediately.

Approved March 22, 1901.

DENTAL LAW OF NEW SOUTH WALES.

FOLLOWING is the text of "An Act to provide for the Registration of Dentists qualified to practice in New South Wales. [Assented to, 5th November, 1900]":

BE it enacted by the Queen's Most Excellent Majesty, by and with the advice and consent of the Legislative Council and Legislative Assembly of New South Wales in Parliament assembled, and by the authority of the same, as follows:

1. This Act may be cited as the "Dentists Act."

2. In the construction of this Act, unless the context otherwise indicates, the following terms shall have the respective meanings hereby assigned to them, that is to say:

(1) "Dental board" or "board"—The dental board appointed under the provisions of this Act.

(2) "Dentist"—A person registered as a dentist under this Act.

(3) "Prescribed"—Prescribed by this Act or by any regulation made thereunder.

3. As soon as may be after the commencement of this Act the Governor-in-Council shall appoint two duly qualified medical practitioners and four dentists, qualified for registration hereunder, and two persons not being either medical practitioners or dentists, to be members of the dental board of New South Wales, and shall also appoint one of such members to be president thereof. All such appointments shall be for a period of three years.

4. If any vacancy occur in the office of member of the dental board during the period for which the first members of the said board are appointed, the Governor-in-Council may fill such vacancy, and the person so appointed shall hold office until the expiration of three years from the date of the appointment of the first members, and no longer.

5. On the expiration of the period for which the first dental board shall have been appointed to hold office four dentists and two medical practitioners shall be eligible for election by the registered members under the dental board for periods of three years, and two lay members of the board shall be appointed by the Governor-in-Council for periods of three years.

6. The board may from time to time appoint a registrar and such other officers as it may think fit for the purposes of this Act.

7. The registrar shall enter in a register, in the prescribed manner and on payment of the prescribed fee, the full names and addresses, date, and description of qualifications for which registration is granted, and all other prescribed particulars of all dentists, and shall transmit in the month of January in each year a certified copy of such register to the Colonial Secretary, who shall cause the same thereupon to be published in the Government Gazette; a copy of such Gazette shall be *primâ facie* evidence, in all legal proceedings, that the persons mentioned therein are registered according to the provisions of this Act, and the omission of any name therefrom shall be *primâ facie* evidence that such person is not so registered.

8. The board shall cause to be removed from the register the names of deceased dentists.

9. The board may refuse to register as a dentist or may remove from the register any person who—

(a) has been convicted of any felony or misdemeanor, or of any offence which, if committed within this Colony, would be a felony or misdemeanor; or

(b) has been guilty of infamous conduct in any professional respect:

Provided that in the case of a charge of infamous conduct as aforesaid the board shall make due inquiry, sitting as an open court, and the person charged shall be afforded an opportunity of defence, either in person or by counsel, and shall have the right of appeal to the Supreme Court, and such appeal shall be in the nature of a rehearing:

Provided further that any such person shall not be refused registration nor have his name removed from the register on account of a conviction for an offence which, though within the provisions of this section, does not, either from the trivial nature of the offence or from the circumstances under which it was committed, disqualify a person for practicing dentistry, nor until he has been called on to explain any objection raised against him.

10. Where the board directs the removal from the register of the name of any person, the name of that person shall not be again entered on the register, except by direction of the board, or by order of a court of competent jurisdiction. The board may, if it thinks fit in any case, direct the registrar to restore to the register any name removed therefrom without fee, or on payment of such fee, not exceeding the registration fee, as the board may from time to time direct, and the registrar shall restore the same accordingly.

11. Any person who—

(a) holds some recognized certificate as hereinafter defined, and who proves to the satisfaction of the board that he is of good character:

- (b) has for a period of two years before the commencement of this Act been bona fide engaged in New South Wales in the practice of dentistry, either separately or in conjunction with the practice of medicine, surgery, or pharmacy, and who has made application for registration to the board within one year from the commencement of this Act; or
- (c) has attained the age of twenty-one years and has been engaged during a period of not less than four years in the acquirement of professional knowledge in dentistry, and has passed an examination before the board according to the prescribed regulations; or
- (d) has attained the age of twenty-one years, and shall have been a pupil or apprentice for a period of not less than two years to a dental practitioner entitled to be registered under this Act: Provided that such pupilage or apprenticeship shall have been commenced at least six months before the commencement of this Act, and shall have expired before he shall be entitled to be so registered; or
- (e) has obtained a diploma or degree in dentistry from a university in Australia;

shall be entitled to be registered as a dentist under this Act.

12. Any person who has practiced dentistry for not less than twelve months elsewhere than in New South Wales, and who holds some recognized certificate as hereinafter defined, and who proves to the satisfaction of the board that he is of good character, shall be entitled upon the payment of the prescribed registration fees and without examination, to be registered as a dentist under this Act.

The term "recognized certificate" means a certificate, diploma, membership, degree, license, letters, testimonial, or other title, status, or document granted by some university, college, or other public institution in a British possession or foreign country, and which is recognized by the board as entitling the holder thereof to practice dentistry in such possession or country, and as furnishing sufficient guarantee of the possession of the requisite knowledge and skill for the efficient practice of dentistry.

13. From and after the first day of January, one thousand nine hundred and one, no person other than a duly qualified medical practitioner shall be entitled to take or use the name or title of "dentist," or of "dental practitioner" or of "dental surgeon," or any name, initials, title, addition, or description implying that he is registered under this Act, unless he is registered hereunder. And any person who after the first day of January, one thousand nine hundred and one, not being a duly qualified medical practitioner or a dentist so registered, takes or uses any such name, initials, title, addition, or description as aforesaid shall be liable on conviction to a penalty not exceeding twenty pounds.

14. A copy of the register kept in pursuance of this Act, signed by the president of the dental board, shall, in any proceedings under this Act, be prima facie evidence that the persons whose names are therein contained and no others were, up to and including the time when the said copy of the register was so signed, legally qualified dentists.

15. The board may, with the approval of the Governor, make, alter, and repeal regulations for carrying this Act into full effect, for the nomination and election of members of the board (after the first nominated board), and for regulating the proceedings of the board, fixing quorums, the removal of members of the board, regulating the duties of its officers, prescribing what certificates, diplomas, membership, degrees, licenses, letters, testimonials, or other titles, status, or documents will be recognized by the board under section twelve, and for holding examinations and prescribing the subjects and fees therefor. All such regulations shall, upon being published in the Government Gazette, be good and valid in law, provided that a copy of all such regulations be laid before both Houses of Parliament within fourteen days from publication thereof, if Parliament be then in session, or otherwise within fourteen days after the commencement of the next ensuing session.

16. Any registrar or other person who wilfully makes or causes to be made any false entry in or falsification of the register, and any person who wilfully

procures or attempts to procure himself or any other person to be registered under this Act by making or producing, or causing to be made or produced, any false or fraudulent representation or declaration, either verbally or in writing, and any person aiding or assisting therein, shall be guilty of a misdemeanor, and shall on conviction be liable to be imprisoned, with or without hard labor, for any term not exceeding twelve months.

17. The board may examine any person upon oath, or take a solemn declaration from any person for the purposes of this Act; and if any person wilfully makes any false statement upon such examination or in such declaration, or utters or attempts to utter or put off as true before the board any false, forged, or counterfeit certificate, diploma, license, letter, testimonial, or other document or writing, he shall be guilty of a misdemeanor, and shall on conviction be liable to be imprisoned for any period not exceeding twelve months.

18. All informations for offences against this Act shall be laid by the registrar, or some other person appointed by the board for that purpose, and all penalties when recovered shall be paid to the dental board for the purposes of this Act. All such penalties may be recovered before any stipendiary or police magistrate or two justices of the peace sitting in petty sessions.

19. The fees mentioned in the Schedule to this Act shall be payable by persons applying to be registered, or obtaining certificates of registration under this Act, or inspecting the register respectively, to the registrar, and shall be applied by the board in defraying the expenses and carrying out the provisions of this Act.

SCHEDULE: On application until 1st January, 1901, £2 2s. On application after that date, £5 5s. Certificate of registration, 5s. Inspection of register, 5s. Alteration of register, 5s.

PERISCOPE.

NEW ANESTHETIC MIXTURE.—A new anesthetic mixture consisting of chloroform and oxygen has been proposed by Dr. Wohlgemuth and administered in his demonstrations at the "Berlin Union for Internal Medicine," January 21, 1901. Oxygen is supplied from the well-known iron cylinder carried to a face-piece into which chloroform falls in drops. The narcosis is generally very quiet, the pulse remains slow and moderate; disagreeable occurrences are not as yet reported, and recovery from the narcosis proceeds rapidly. Dr. Wohlgemuth has employed this mixture in his practice to a considerable extent, but upon his suggestion it has also been made use of in the surgical clinic of Professor von Bergmann, as well as in the Jewish Infirmary, and mostly with great satisfaction. In the discussion, Dr. Wohlgemuth stated that no fatalities have so far occurred within his experience.—*Zahnärztliche Rundschau*.

DEATH UNDER NITROUS OXID.—A recent inquest held by Dr. Danford Thomas, the coroner for the county of London and Central Middlesex, upon a patient lately in the Great Northern Hospital, illustrates one of the few dangers which are incidental to the use of nitrous oxid. The patient, a man, aged 36 years, was admitted as an out-patient, declining to be taken as an in-patient, at the Great Northern Hospital. He was then suffering from supuration in the structures of the neck. The swelling extended from the left ear round the jaw and well beyond the middle line. The left tonsil and structures between it and the outside were swollen and inflamed. As incisions were urgently called for the man was made to inhale nitrous oxid. This was given by one of the officers of the hospital who gave the gas diluted with air at first, but subsequently he employed pure nitrous oxid. An extremely small quantity of gas—a bag and a quarter—is said to have been

inhaled and it is expressly stated that no re-breathing from the bag took place. When the ocular reflex was still present the incision was made and respiration ceased. It is said to have disappeared after the "excited stage." Possibly the man was never fully under the gas and the cessation of respiration was due to syncope from fear in the semi-conscious condition. However, the house surgeon stated at the inquest that the death was due to asphyxia. At the necropsy edema of the larynx was found to exist and the lungs were congested. Tracheotomy, which was performed as soon as the breathing failed, was unsuccessful and respiration never returned. These facts certainly point to heart failure as an element in the case. In all conditions in which the upper air passages are swollen and edematous and respiration is hampered nitrous oxid is contraindicated as it is liable to intensify the obstruction by promoting venous engorgement. That nitrous oxid is the safest of all known anesthetics is now accepted on all hands, but as it is commonly given with little or no air there is a tendency to asphyxial complications, themselves not a necessary part of nitrous oxid anesthesia. If there is a pathological state present in the patient these complications may become dangerous. Again, incomplete anesthesia under nitrous oxid is a source of peril. In it heart failure not infrequently occurs and has on several occasions proved fatal. The death was no doubt asphyxial in so far as the edema of the glottis probably under the gas closed the air passages completely; but whether death would have occurred if the nitrous oxid factor could have been eliminated is, we think, a question open to argument. As we read the report it appears that either too much or too little of the anesthetic was given. We are certainly imputing no blame, for such cases are extremely difficult to deal with and the judgment of even the most expert anesthetist might lead him astray in his endeavor to do his best for his patient.—*Lancet*.

NEW METHOD FOR COUNTING BACTERIA.—Alexander Klein, privatdocent and assistant at the Institute of Hygiene and Bacteriology of the University of Amsterdam, reports the following method, based upon staining the bacteria in a moist state: To a definite quantity ($\frac{1}{2}$ c.c.) of the fluid culture or of an emulsion of a solid culture in physiological salt solution, is added the same quantity of anilin-water-gentian-violet (Ehrlich). The two fluids are mixed in a watch-glass by means of a platinum wire, and after two or three minutes the bacteria are very intensely stained. After the bacteria have become equally distributed throughout the fluid by the stirring process, a measured quantity is taken by a graduated platinum loop and evenly distributed over a clean cover-glass. The preparation is allowed to spontaneously dry in the air and then passed once or twice through a flame. Without rinsing the specimen is fixed in xylol Canada balsam and then put under the microscope. The bacteria are stained very dark and are easily recognized. With the micrometer eye-piece the counting of fifty fields will furnish sufficient data, and with a little practice this can be accomplished in from fifteen to twenty minutes. Through a simple calculation, having reference to the size of the platinum loop, the cover-glass, and the field of view of the microscope, one can determine the number of bacteria contained in 1 c.c. of the fluid culture or of the emulsion. This method can only be applied when a large number of bacteria are present.—*Centralbl. f. Bakteriöl., Parasitenk., u. Infektionskrankh.*, Bd. xxvii, 1900.

A NEW DENTAL REGULATION IN GERMANY.—The Royal Chief Office of Police has published under date of February 20, 1901, the following announcement in the newspapers:

"According to verdicts of the high courts of appeal, all persons who, without having graduated in Germany, style themselves *Arzt*, *Wundarzt*, *Augenarzt*, *Geburtshelfer*, *Zahnarzt*, *Nervenarzt*, *Naturarzt*, etc., or use any title containing the word '*Arzt*,' are trespassers against the law. Also the culpability is not excluded by additions,—as for instance, '*graduated abroad*,' '*not graduated*,' etc., which are intended to show that the person in question has not obtained approbation by license in Germany. Such persons may expect the same prosecution as those who style themselves in such a manner as

to make people believe that the holder of the title has passed an official medical examination; and it is immaterial as to whether such person has so styled himself hitherto without being prosecuted."

Herewith the question again arises whether the titles "in Amerika approbirter Zahnarzt" or "amerikanischer Zahnarzt" are a misdemeanor against Section 143 (R. G. O.), Trade Regulations of the Empire, and are again threatened with prosecution. According to the verdicts of the Berlin Kammergericht (court of appeal) the question of the culpability of the one styling himself "Zahnarzt," with explanatory addition or without, whenever such person uses it, not having graduated from a German university, must be finally confirmed.

After the Landes Central Behörden of the German Empire have made the use of a foreign title in future as doctor, etc., dependent upon special permission, there has now been submitted by the Home Office of the Empire the draft of decree to the competent committee of the Bundesrath, in accordance with which the *further use of foreign titles, which hitherto have not been objected to*, is FORBIDDEN, if the same have been acquired under conditions less stringent than they can be acquired in Germany. All American titles will be forbidden as soon as this decree is sanctioned.

Societies belonging to the Union of German Zahnkünstler have proposed a private examination of their members and the bestowing upon them of a diploma as "examined dentist," but it is asserted that the Central Behörden intend taking energetic measures against this new styling of those who have not graduated from German universities, as soon as some one publicly makes use of this title, as a punishable contravention of the law is seen in it. The only persons allowed to style themselves "Examined," are those who have passed an examination before a state commission, or a commission which has been authorized by the state authorities. The styling "Dentist" is forbidden as well, because in other cultivated countries by the term "dentist" is understood a person duly licensed by the authorities (authorized) to practice dentistry.

DENTAL CARIES AS A FACTOR OF DISEASE.—Hundreds and thousands of people are going about with rotten teeth, carrying with them so many small cesspools in their mouths, filled with fetid abominations of stinking food *débris*, with its teeming population of micro-organisms, and the resulting toxins as concomitants, and daily swallowing these putrefactions, and absorbing the pus. Many cases of septic disease are due to dental caries, and to that alone. Its effects may be manifested in multifarious ways. The author reports a case of persistent spasm of the right hand, of two years' duration, the diagnosis having been tetany or hysteria. Finally, two septic molar teeth were observed and removed, with the result that the spasm disappeared, not to return. Many of the so-called "scrofulous" scars of the neck have had their starting-point in carious teeth. The usual complaint by patients that fresh air will give them face-ache is in most cases due to uncared-for carious teeth. Many laryngeal and pharyngeal troubles have their origin in the same cause. A man with a decayed molar hardly ever has a clean tongue. Insufficient mastication of food is another effect of dental caries. Teeth should be cleaned twice a day and always the last thing at night. A tooth-brush should be considered as a conglomeration of toothpicks, and used accordingly. Children should never be allowed sweets or biscuits on going to bed. And the teeth should be inspected by a dentist from time to time as a matter of routine.—*N. Y. Med. Journal* (abstract of article by Dr. J. R. Leesown in *Edinburgh Med. Journal*).

ORAL SEPSIS AS A CAUSE OF DISEASE.—Sepsis may arise from diseased conditions of the mouth in connection with a number of general infective processes. This condition, though frequent, is apt to be overlooked.

Case 1.—A woman had suffered for ten months from gastric pain, sickness, and nausea. She was cachectic in appearance, and the symptoms were attributed to cancer though no growth was detected. The pain was at times very severe, and the sickness usually occurred in the morning and had no relation to food. She had lost her sense of taste and had a constant bad

taste in the mouth. Her teeth were absent with the exception of four stumps, from the sockets of three of which pus oozed on pressure, but her tooth plates were clean and in good condition. The symptoms being attributed to the continual swallowing of pus the teeth were extracted, and immediate improvement took place, but was not maintained. A severe attack of pain and vomiting occurred and lasted about three weeks, at the end of which time a specimen of the vomited matter was found to contain blood, fibrin, leucocytes, and gastric cells with masses of pyogenic organisms,—streptococci and staphylococci. The patient was now confined to bed and fed entirely on peptonized gruel, beginning with one and one-half pints daily. Counter-irritation was applied to the stomach and sedatives were administered, while with the view of combating the septic condition three grains of salicylic acid were given thrice daily and continued from two to three months. Improvement was immediate and continuous. Sickness and pain were checked in twenty-four hours. The pulse-rate and temperature fell, and in ten days she was able to go out and began to gain in weight.

The power of the stomach to destroy organisms depends on the presence of free hydrochloric acid. If there is an increased supply of organisms with diminished secretion of acid, as in gastric catarrh, septic infection of the stomach is readily set up. This is specially apt to occur from dental decay, and such patients present an ashy gray look and an air of langour often associated with distaste for food and periodic nausea. The following cases illustrate the frequency of this condition and the ease with which it may be overlooked even while the patient is being treated for the local effects:

Case 2.—A woman had suffered from periodic attacks of fever and rashes which had come on at irregular intervals for two or three years. She had also marked nervous disturbances. There was a typical blotchy septic rash over the legs, arms, and body. About a month previously her dentist had removed a tooth-plate which had partly grown into her upper jaw, and which she had worn for several years.

Case 3.—An old man complained of sickness, nausea, disturbance of digestion, and a foul taste in his mouth, which symptoms had lasted for twelve months. His tongue was red, and looked like a piece of raw meat, and the gums in both jaws were red and inflamed. He wore two tooth-plates. The lower was removed with difficulty, as it had not been taken out for a month. Around and beneath this plate much decomposing material had collected. The lower jaw contained three blackened teeth, of which one was loose, and four decayed stumps, one of which was also loose. He was put upon milk diet, directed to boil the plates, and go to the dentist, who reported he saw nothing requiring treatment. A week later he was able to enjoy a cutlet, and the tongue and gums were cleaner though there was still some stomatitis. He was directed to disinfect his mouth night and morning, to use an astringent wash, and to see another dentist.

Case 4.—A woman had suffered for fifteen to twenty years from intense salivation at intervals of five or six weeks, which passed off after an attack of diarrhea. She had severe stomatitis all over her mouth and pustules in connection with carious stumps. She wore two tooth-plates which she said were ill-fitting and caused discomfort. These plates had been unchanged for fifteen to twenty years, and during that time had only been cleansed with a tooth-brush.

Case 5.—A woman suffered from profound septic poisoning. The mouth was in a state of extreme ulcerative, almost gangrenous, stomatitis. Her temperature ranged from 105° to 106° . She had been in this condition for seven to ten days. She had had a tooth removed and the root remained. There were an abscess of the jaw and a sinus with pus lying around it on the gum. The hard palate was sloughing. The parts were scrubbed with one in twenty carbolic lotion, and in forty-eight hours the mouth looked almost normal, although the patient was almost moribund with septic pneumonia.

Case 6.—A youth suffered from inflammation of the gums after extraction of a tooth. Stomatitis set in and spread till the teeth became loose. Half the lower jaw became completely necrosed and there was a foul gangrenous condition of the whole superior maxilla, which produced acute septicæmia, hemorrhagic nephritis and death.

Case 7.—A patient, who died of pernicious anemia, presented no dental history during life. Post-mortem the teeth were found to be decayed in their sockets with alveolar abscesses connected with them. There was supuration of the ethmoidal sinus on the left side.

Oral sepsis is apt to occur after the capping of carious teeth, or when the gold capping is extended as a bridge between two teeth over the adjacent gum.

Case 8.—A patient complained of salivation due to a bridge of this kind which produced local stomatitis. On the removal of the bridge the space beneath was found to be filled with septic material, on removal of which the salivation ceased. He had a gold cap which was removed at the same time as the bridge, and replaced by another. Some weeks later salivation recurred with gingivitis round the capped tooth. On removal of the cap it was found that it covered a minute carious cavity in the neck of the tooth close to the edge of the gum.

It is important to remember that the gastritis in these cases is not due to dyspeptic trouble but to sepsis caused by the carious teeth. Besides gastritis local effects such as tonsillitis, pharyngitis, otitis, abscesses, and glandular swellings in the neck may occur in connection with diseased teeth. More remote effects are ulcerative endocarditis, meningitis, septicemia with purpuric hemorrhages, pyemia, and osteomyelitis. These should be guarded against by oral antisepsis. A solution of one in twenty or one in forty carbolic acid should be applied over each diseased tooth or stump as long as the patient delays having the tooth removed. A teaspoonful of the one in twenty solution to half a tumblerful of water may be used as a mouth-wash. All diseased stumps, especially when lying under a tooth-plate, should be removed. Patients should be directed to disinfect their plates by boiling. Dental apparatus which cannot be removed, and therefore cannot be rendered aseptic, should be avoided and dentists should be warned of the risks of a septic condition of the mouth.—*Wm. Hunter, M.D., F.R.C.P., in Clinical Journal.*

HINTS, QUERIES, AND COMMENTS.

A USEFUL JACK-SCREW.—Having a case recently when a long jack-screw would be an advantage, I found that some one had screwed an old jack into the end of a disk mandrel, and that I had one already in my case without the necessity of cutting a new thread.

Having found, therefore, that the thread of the various jack-screws and mandrels are the same, I send this wrinkle to "Hints, Queries, and Comments," hoping that others will find it as useful as I did. The head should be filed or ground square, and the mandrel cut the proper length of the case, and the "long jack" is ready for business.—**WILLIAM H. MITCHELL, D.D.S., Bayonne, N. J.**

RESETTING A CROWN WITHOUT REMOVING THE ORIGINAL PIVOT.—A gentleman came to me with an upper right porcelain lateral with gold back, the pivot, a platinum one, being broken off flush with the root. I tried to remove it in my usual way without success, the root being small, which allowed but little room for cutting around. I then made an instrument on the principle of a trephine, but bored much deeper, and a little smaller than the platinum pivot. With this instrument I bored well up into the root, and as I feared cutting it too thin ceased boring. Finding the pivot still firm, I made a tube the size of the pivot,—*i.e.*, which would slide over it, soldered this tube to the gold backing, filled the tube with cement and proceeded the same as in setting a crown the usual way. After nearly a year I find it to be

as firm as though set in the ordinary manner.—A. H. STEVENS, Clinton, Conn.

A SHORT-BITE CROWN.—Thinking that possibly the readers of the *DENTAL COSMOS* might be interested in the making of porcelain crowns for the bicuspid and molar teeth where the occlusion is so very short that it is considered almost impossible to use any other crown except a gold shell, I will describe some that I have been making which are giving perfect satisfaction and are showing very great strength.

Proceed to grind down the tooth as for a Richmond crown, take a wire measure, and for the band cut the gold wide enough to have the band extend above the end of the root as it passes down around it. Remove and solder a piece of plate inside of the band, adjust, drill a hole for the post while in position, pass the platinum post through, fasten with wax, remove and solder the post to the cap; then with pliers bend the extended end of the post over to make a good hold for future use; again adjust on the root. Select a rubber plate tooth,—one that is made for short-bite plate work, getting size and color to suit. Put a piece of wax in the cap, then slightly warm the tooth, place it in the cap, and request the patient to close the teeth together carefully, after which remove the entire piece and proceed to flask and vulcanize as for any rubber work. When finished, set in position the same as a Richmond crown. This crown is very natural in appearance, is strong, easily made, and I think it preferable to gold in most cases.—A. M. MAGEE.

[NOTE.—White vulcanizable rubber may be used to artistic advantage in filling a crown of this character.—ED. *DENTAL COSMOS*.]

RETENTIVE DEVICE FOR PORCELAIN INLAYS.—Dr. Erich Schmidt, of Berlin, recommends the following method for obtaining undercuts in porcelain inlays, which avoids the trouble so often experienced in making undercuts with corundum or diamond wheels in the finished inlay. His procedure is as follows: After having prepared the gold matrix, small pieces of copper in the form of wire, plate, or small globules are placed on the floor or at the sides of the matrix, after which the porcelain mass is introduced and fused in the usual way. After fusion the small pieces of copper will be exposed more or less from the back surface of the inlay, from which they are dissolved out completely by subjecting them to a bath of nitric acid, which removes the copper without damaging the porcelain in the least, after which the piece is ready for insertion. Dr. Schmidt finds that the undercuts or depressions, so made, materially aid in holding the inlay firmly in place.

Replying to an inquiry from the editor of the *DENTAL COSMOS*, Dr. Schmidt writes as follows: "In answer to your inquiry about the discoloration of the porcelain inlay during its process of fusion on the copper, I can assure you I never have had any failure in that direction. Will you be kind enough to add the following to my publication: "From many sides I hear the complaint that the nitric acid is very slow in dissolving out the copper. That is true if the thin layer of enamel over the copper is not ground away first. Put the inlay with a few drops of the acid in a test tube, warm over a flame, and in a few minutes the work is done thoroughly."

A CAUSE OF FAULTY ARTICULATION OF ARTIFICIAL DENTURES.—The death of Dr. Bonwill seems to have called forth renewed study of his system of articulating artificial teeth, and I for one feel very thankful to Drs. Snow, Grit-

man, and others, for the additional light they have thrown upon the subject. We have been shown that we cannot place the "bite" in the articulating frames at haphazard without danger of resulting error in the bite of the dentures when made and placed in the mouth, and it has been impressed upon us that if we would have teeth do good service in mastication we must use large molars and not grind their occluding surfaces flat, but make them with cusps and sulci adapted to mesh with each other.

And here I want to point out one cause of faulty articulation,—one which becomes especially important as we abandon flat grinding surfaces and adopt those shaped according to nature. The source of danger lies in the flask. When a flask is new, all is well, but when it has been used for some time the guide-pins become worn or corroded, and can no longer be relied on to draw the two sections of the flask together in the positions they occupied before the removal of the wax. If the misclosure is lateral, the result will be that the cusps will not mesh into the depressions of occluding teeth, and therefore every closure of the jaws will tend to displace the plates laterally. If the misclosure of the flask be from front to back, or *vice versa*, the cusps of the bicuspid will fail to mesh correctly, and each closure will tend to force the plates respectively backward and forward.

About twenty years ago this problem of the closure of flasks came up in my mind, and I arrived at the conclusion,—or some other dentist told me, or I read,—that a close fit of guide-pins was unnecessary; that the general contour of the plaster would force the closing halves of the flask to their original position. I am now persuaded that this theory was wrong, and that only when the matrix half of the investment is deeply and evenly concave (which is very rarely the case) does the plaster control the closure of the flask to anything near that precision which is necessary for the proper articulation of artificial dentures.—STEWART J. SPENCE, Harriman, Tenn.

REMOVABLE BRIDGE WITH VULCANITE ANTERIOR SADDLE.—Mrs. S. called at my office to have a lower plate made. On examining her mouth I found that absorption had taken place to such an extent as to leave not a particle of the ridge on which to support a plate, except anterior to the first bicuspid. This consisted of a flat narrow surface about one-eighth of an inch wide. There still remained on the left side the first bicuspid root projecting about three-sixteenths of an inch above the gum, also the first molar. On the right side there were still the first and second bicuspid.

I decided to use these teeth as a support, with a saddle on the remaining anterior ridge. The pulps of these teeth I devitalized, and also treated the root. Crowns were made having parallel sides and flat tops (Fig. 1, A, A), and were cemented in place. Another set (Fig. 2, B, B), was made to telescope these, the one on the root being only half as long as the others.

After placing these on the crowned teeth, an impression was taken, the crown remaining in same. A model of investment was made, a piece of square iridio-platinum wire No. 12 was barbed on all four edges, and soldered from the molar on the left side to the top of the cap on the root. This was bent to the outline of the ridge, soldered to the first bicuspid on the right side and the second joined to the first. A molar (Fig. 2, D) was winged to the second bicuspid. This was then placed on the teeth. A wax bite was taken. Plaster was then placed on the wire covering the ridge and between first molar and bicuspid. A model of plaster was then made, and model and bite

placed in the articulator. The teeth (Fig. 2, C, C) were waxed in position and vulcanized to the wire, the crowns with the narrow saddle making a firm support. I would add that the permanent crowns on the teeth were made

FIG. 1.

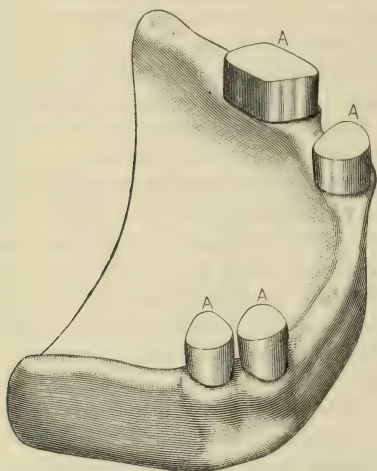
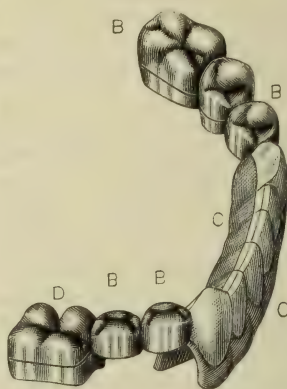


FIG. 2.



A, A, Permanent crowns. B, B, Telescope crowns. C, Vulcanite saddle. D, Winged molar.

about an eighth of an inch thick on top to allow of their being cut off in case the plate should sink on the ridge by absorption. After having been in use about a year, the patient reports it as giving good satisfaction.—A. W. WIMMER, 279 E. North ave., Chicago, Ill.

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

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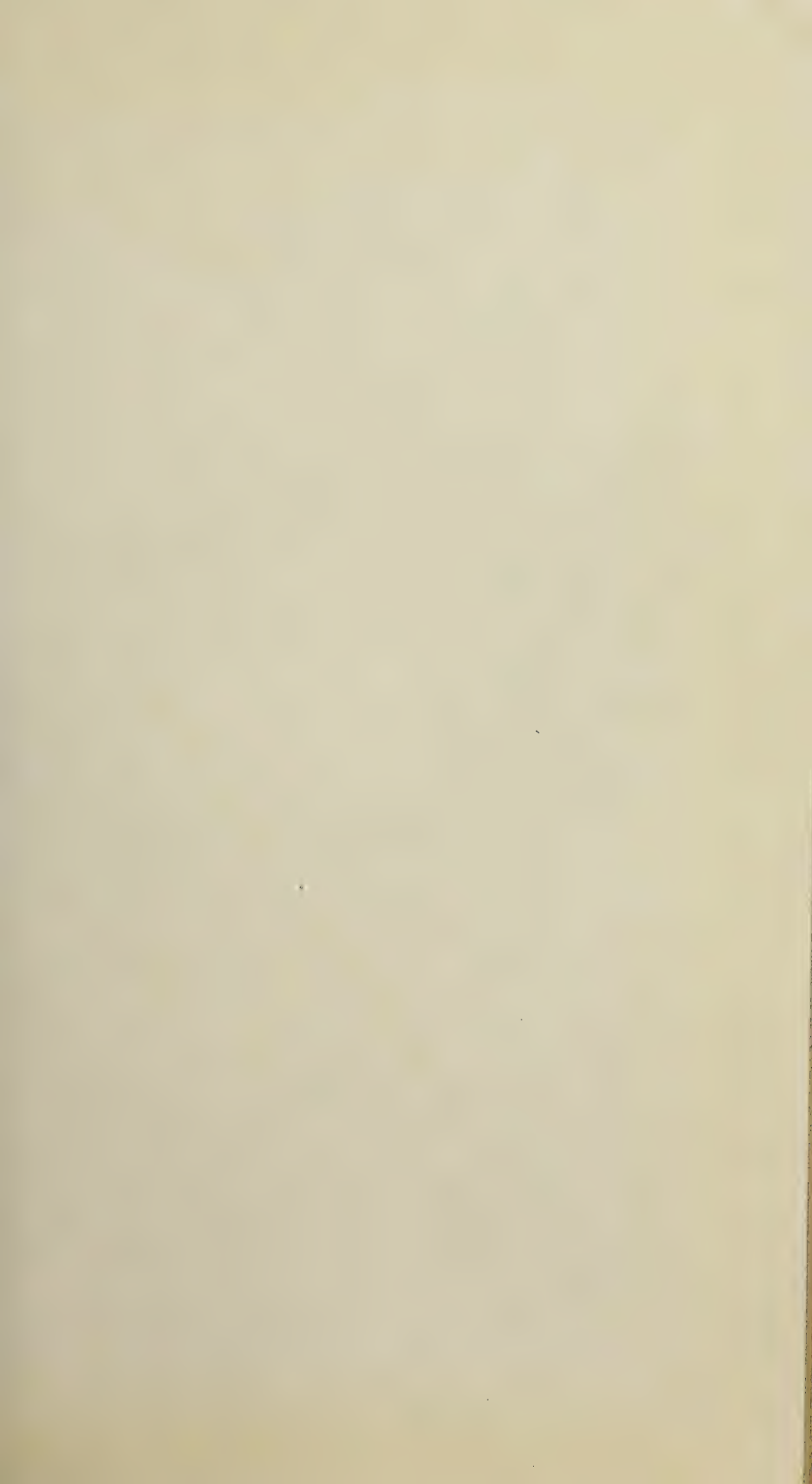
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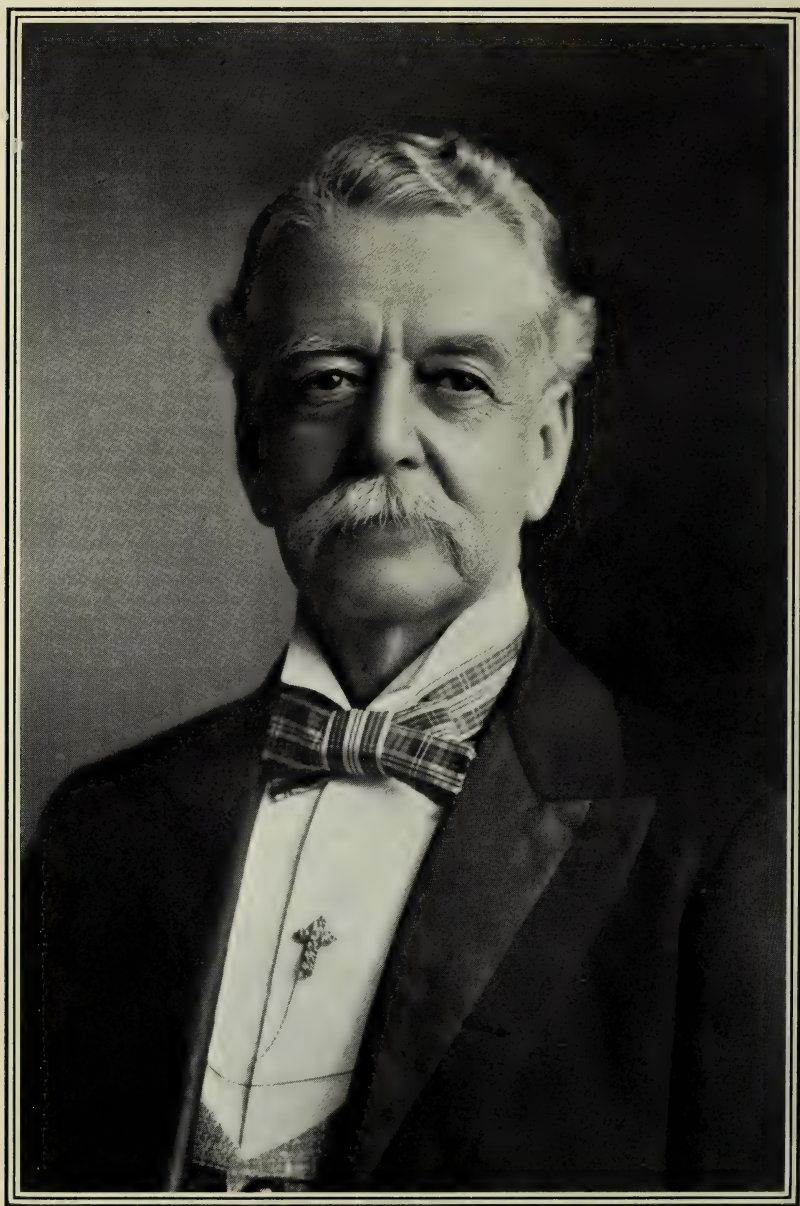
LIST OF UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING MARCH, 1901.

- Mar. 5.*—No. 669,092, to HUGH H. MARTIN. Dental regulator and spacer.
- " "—No. 669,197, to ADAM W. FELTMANN and HENRY HARTWIG. Vulcanizer and flask.
- " "—No. 669,402, to CARL ROSE. Tooth-brush.
- " 12.—No. 669,665, to BERNARD RUBINSON. Artificial tooth mold.
- " "—No. 669,963, to WM. K. SLATER. Artificial tooth.
- " 19.—No. 670,069, to WALES VAN AME. Brush holder.
- " 26.—No. 670,481, to CHAS. A. KIRKWOOD. Brush and dentifrice bracket.
- " "—No. 670,604, to ARNOLD BIBER. Dental plate.
- " "—No. 670,773, to ENOCH M. FREDERICKS. Dental chair.
- " "—No. 34,288, to CHAS. F. DAVIDSON. Design for head-rest.





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THE
DENTAL COSMOS.

VOL. XLIII.

PHILADELPHIA, JUNE, 1901.

No. 6.

ORIGINAL COMMUNICATIONS.

THE DISINTEGRATION OF CEMENT FILLINGS.

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(Read before the International Dental Congress at Paris, August 8, 1900.)

FROM years of observation we have discovered two distinct actions on cements: one, the mechanical attrition; the other, the dissolving away under the free margin of the gum. The first amounts to very little; the second is the principal cause of the failure of cement fillings. Since the loss at the exposed surface of the filling is very small, it is evident that the saliva plays no important part in the destruction of cement. As the principal loss is beneath the free margin of the gum, it seems possible that the dissolving of a cement is due to acids or alkalies formed by bacterial fermentation of inclosed foodstuff. The problem then presented itself to us as follows:

First, to determine the composition of cements; *second*, to determine, if possible, the amount of acid or alkali formed by the common bacteria of the mouth when they act upon foodstuffs; *third*, to see if these acids or alkalies will dissolve the cements.

The first part of the problem is one which has been worked at for thirty years, but no definite results, from a chemical standpoint, have been obtained. A glance over the literature of cements will convince you of this fact. The following is a careful *résumé* of all the literature on this subject from 1870 down to the present time:

In 1870, Dr. L. N. Hutchinson, of Michigan, first called the attention of the profession to Guillois's cement. From his experi-

ments he concluded that it would supersede all metallic fillings and be an introduction of a new era in saving decaying dentin. Hutchinson found it a non-conductor of thermal changes, while it adheres like glue to dentin, cementing itself to it, air- and water-tight. (DENTAL COSMOS, 1871, xiii, p. 309.)

Dr. William Herbert Rollins, of Boston, in his paper entitled "A Contribution to the Knowledge of Cements," states that for seven years he tried to find a cement for filling teeth, and concluded from his analyses that all the cements then in the market were zinc oxychlorid. He gives the following analyses of two cements at that time but recently introduced:

FLETCHER'S.		WESTON'S.	
<i>Fluid.</i>	<i>Solid.</i>	<i>Fluid.</i>	<i>Solid.</i>
Phosphoric acid.	Basic zinc oxid.	Phosphoric acid.	Basic zinc oxid, 80 per cent.
Phosphate of alumina.			Silicate of alumina, 20 per cent.

The silicate of alumina in Weston's cement is inert. He claims that the two cements are less irritant than zinc oxychlorid. He also states that twenty per cent. of sodium phosphate is often found in the glacial phosphoric acid.

Rollins gives the following directions for making a phosphate cement: Concentrate pure phosphoric acid until semi-solid; mix aluminum phosphate with it by heating. For use, mix with basic zinc oxid to the consistence of putty. It sets in two minutes.

He also asserts that by calcining magnesium nitrate an oxid is made, and that this, when hydrated, forms a durable cement. When mixed with phosphoric acid it hardens at once, growing so hot as to burn the hand. As basic zinc oxid forms with phosphoric acid a slower-setting cement, the indication is plain.

Rollins has used for pulp-capping and temporary fillings the following mixture:

Basic zinc oxid, 2 parts;
Magnesium oxid, 5 parts.

Grind them together. For use, mix to a paste with syrupy phosphoric acid. This sets in thirty seconds. Rollins believed that the future filling would be a cement, and that these are but transitory. (DENTAL COSMOS, 1879, xxi, p. 574.)

White zinc cement is an excellent varnish to protect oxychlorid fillings. It is a chloroform or naphtha solution of hard Canada balsam, colored with zinc oxid. (DENTAL COSMOS, 1879, xxi.)

Dr. Miller, of Berlin, states that the oxyphosphate cement is highly recommended by various practitioners in Europe, as well as in America. He says he has tested it in every way. His experiments consisted in boring holes in strips of hard wood or ivory, filling them with various cements to be tested, and immersing the strips in solutions of various organic acids; also in mixtures of saliva and bread, saliva and sugar, etc. The oxyphosphates of Poulson, Wolff, Lorenz, Rostaing, etc., withstood the action of the solvent about equally well, and far better than any of the oxychlorids.

Miller further states that one other result of his experiments induced him to use the oxyphosphates to some extent in his practice; an unfortunate result, for he concludes that of all materials put into the hands of dentists for filling teeth, the oxyphosphates are the most unreliable and treacherous. Fault sometimes lies with the material. If the manufacturer succeeds in producing a good article, and if the operator succeeds in keeping it under such conditions that it is does not attract too much moisture, and if he by chance mixes it in just the proper proportions to give the best results, and inserts it and finishes the filling with the proper amount of care under complete exclusion of moisture, then, in crown cavities, it may in some mouths last four or five years, or even longer. In all those cases where a filling of the nature of cement seems most to be indicated, in extensive cavities on the approximal surfaces of bicuspid and molars, nearing the pulp, it has proved a failure in Miller's experience.

As a capping for exposed pulps oxyphosphates have, in his experience, proved an equal failure.

Miller suggests that where it is necessary to leave decayed or decaying dentin in the cavity, oxyphosphates should be avoided, as the smallest amount of moisture in the dentin prevents the thorough adaptation of the cement to the tooth structure. (*Independent Practitioner*, 1885, vi, p. 61.) •

Dr. A. Morsman, of Omaha, says that cements are becoming more generally used. They are secret preparations, proprietary articles, the formulæ of which are, as a rule, unknown to dentists who use them.

Zinc oxyphosphate is a mixture of the phosphate and zinc oxid. Morsman states that there has been a great deal of ignorance displayed in the discussion of this material, and a great deal of confusion created by those interested in its manufacture. Dentists are, unfortunately, not chemists, and so are frequently led into serious blunders when discussing complex chemical subjects,—a matter not at all to their discredit, for few men who become noted in dentistry can be experts in chemistry also. With all kindness and respect, Morsman calls attention to some misstatements that have been made,—viz:

Professor Flagg, in his "Plastics and Plastic Fillings," page 163, makes a distinction between the phosphates and the oxyphosphates. He speaks of the "obdurate nitrate of zinc as their powder," meaning the powder from which the cement is made, and says that those preparations which have the zinc nitrate as the powder, "are entitled to the appellation 'zinc phosphate'" for that reason. Nitrate of zinc is "obdurate," sure enough, in this connection.

Morsman thinks he has evidently been misled by his manipulation, and that it would be impossible to make a cement of such a combination as he speaks of. Zinc nitrate is a caustic used in the same manner as silver nitrate, or caustic potash, either in pencils or paste. It is very soluble and absorbs moisture so readily that to keep it the United States Dispensatory directs to place it in a tin box containing quicklime.

Dr. Niles, the maker of lithoid cement, states that the zinc oxid is reduced to the sub-oxid, and gives his process for this reduction.

Morsman is of the opinion that there is no sub-oxid of zinc known. He does not believe that Niles's process will succeed when the U. S. P. oxid is used, although it might with the commercial oxid. It is possible that by long heating in a closed crucible, as he directs, an intimate mixture of the oxid and metallic zinc might be made, but he sees nothing to be gained by that. There is a great difference between the U. S. P. zinc oxid, which is pure, and the commercial oxid, which is slightly impure, in their action with phosphoric acid, and yet it is difficult to see why. The commercial article is almost pure; there are several impurities, but none of them exceeds a fraction of one per cent. This article is readily miscible with a syrupy solution of glacial phosphoric acid, works like putty, hardens nicely, but is worthless as a cement. The official oxid will not mix with the fluid until it is especially prepared. (*Archives of Dentistry*, 1887, N. S., iv, p. 241.)

Dr. Jas. W. Whipple, in a paper read at the twenty-fifth annual meeting of the Missouri State Dental Association, remarked that cements, as prepared by the different manufacturers, vary but little as to their constituent elements, except as to their being divided into two great classes: the oxychlorids and oxyphosphates of zinc. This difference is caused almost solely by the character of the liquid employed as a solvent, and not by any particular change in the elements constituting the powder.

The principal and in many cases the sole ingredient in the cement powder is zinc oxid. Remove this substance from any cement in the market and the residuc would be utterly valueless. Other substances, such as silicate of aluminum, magnesium oxid, sodium borate, silex, powdered glass, and sodium carbonate, are added for the purpose of giving additional hardness, or of rendering the cement less soluble in the fluids of the mouth. Dawson's Mineral, Caulk's Diamond, and Justi's Acme cements are composed of nearly pure oxid of zinc, while Weston's Insoluble cement contains about twenty per cent. of the silicate of aluminum.

Whipple found Justi's Acme the most durable of all cements. Mr. Wood informs us that the powder he used in making the Giant cement was almost pure zinc oxid, the peculiar virtues of his very fine cement being the result of his secret and improved method of preparing the liquid. So far as its effect on tooth-structure is concerned, zinc oxid may be regarded as entirely harmless.

The liquid used in compounding an oxychlorid cement is composed as a rule of about sixty-six per cent. of zinc chlorid and thirty-four per cent. of distilled water.

The following is a typical formula for the liquid of the oxyphosphate cements:

Phosphoric acid, prima-basic,	20 parts;
Sodium phosphate	41 "
Distilled water,	39 "
	—
	100 "

Zinc chlorid is particularly an escharotic, and as such causes more or less intense pain when an oxychlorid cement is used in filling teeth. Assuming that the powder and liquid used in forming a filling are equal in quantity, the filling as placed in the cavity would contain about thirty-three per cent. of its bulk of zinc chlorid. Its injurious effects, however, would be largely modified by the chemical changes occurring during the process of crystallization and solidification.

The prima-basic phosphoric acid is made by a formula not varying very much from the following:

Phosphorus,	134 grains;
Nitric acid,	2¼ ounces;
Distilled water,	4 ounces.

This would seem to show that in a completed oxyphosphate filling there is a considerable quantity of both phosphorus and nitric acid,—both, of course, largely modified, or possibly, completely changed by the chemical reaction undergone during process of manufacture. Whipple, however, in a broad and general way, regards the entire list of cements as failures as filling-materials,—that is, regarded as anything else than mere temporary stoppings. He believes the secret of ideal plastic fillings has not been discovered, and that when it is it will be found to rest upon the double foundation of lime and albumin.

Cements may be said to be used in actual dental practice for five different and distinct purposes:

1. As a root-filling.
2. For setting gold or other crowns.
3. As an obtundent.
4. As a capping for the pulp.
5. For filling cavities in teeth.

Taking iron as the standard of measure, and making a comparative scale of 100, the three classes of cements would stand as follows:

Zinc oxychlorid,	6½ per cent.;
“ oxyphosphate,	5 “
“ oxysulfate,	3⅓ “

In the discussion following Whipple's paper, Dr. I. D. Pearce stated that zinc chlorid is a dangerous element to put into a tooth, but asks if it is not possible that it is so changed chemically that it is no longer dangerous.

A zinc oxychlorid filling always causes pain when inserted. The zinc oxyphosphate filling causes no pain when used in sensitive teeth, but if removed within two or three weeks the dentin will be found very sensitive. (*Archives of Dentistry*, 1889, N. S., vi, pp. 409, 520.)

Dr. Louis Shaw says that, as is generally known, cement powder is zinc oxid, usually with some silica added with the idea of making it more resistant to wear.

In most of the directions for preparing the powder, zinc oxid is dissolved in nitric acid and the zinc nitrate is afterward heated to drive off the nitric acid, leaving the zinc oxid. This dissolving

of the oxid is not necessary, and by omitting it anyone can prepare the powder with little difficulty. Most zinc oxids made in the United States are too impure for dental use. French zinc oxid is much purer and makes a very good cement. Shaw found Hub-buck's English zinc oxid the purest he ever obtained; it produces a very white cement. The oxid is placed in a sand crucible and the cover luted in with potter's clay mixed with water. The crucible is then placed in a coal fire and covered with coal so that it will all be brought to a red heat. After being held at a red heat for two hours it is removed and allowed to cool. The oxid is then removed and rubbed to a fine powder in a Wedgewood mortar, when it is bottled to keep it from the air. The liquid is made by dissolving in the water sufficient glacial phosphoric acid to make a dense syrupy solution.

Shaw believes it difficult to state the exact composition of the liquid chemically, as all commercial glacial phosphoric acids contain from seven to fourteen per cent. of sodium phosphate. On being dissolved, the glacial phosphoric acid slowly takes up another equivalent of water, and finally a third, becoming at last orthophosphoric acid. The liquid may then be a mixture of the three phosphoric acids holding sodium phosphate in solution.

The process described produces an oxyphosphate cement that compares favorably with any Shaw has ever purchased, both as to working qualities and insolubility. (*International Dental Journal*, 1897, xviii, p. 636.)

Dr. Telschow, of Berlin, states that he has employed aluminum in his practice during many years, and his observations suggested the preparation of a new filling-material in which he incorporated silicated aluminum and fluorhydric acid. This cement resists the acids in the mouth to an extraordinary degree. He adds that fluorhydric acid has a beneficial effect upon the roots of the teeth, and immediately allays the inflammation of pericementitis. It is introduced into the cavity dry.

For the preparation of the fluorid, a glass of liquid (*a*) is required, a glass of powder (*b*), and a bottle of gutta-percha and of fluorhydric acid (*c*); the liquid is mixed with one-third its volume of the acid. The liquid (*a*) is phosphoric acid. The powder (*b*) is a composition of zinc oxid and aluminum salts. The bottle (*c*) is fluorhydric acid. (*Journal of the British Dental Association*, 1897, xviii, p. 607.)

Sorel's "Tooth Cement" is made of a light zinc oxid prepared by moistening the ordinary oxid with nitric acid and then igniting it. Thus prepared, it is made into a soft paste with a solution of zinc chlorid, having a specific gravity of 1.9 to 2.0. This soft mass speedily acquires great hardness, which it permanently preserves. If a gray color is required, the least trace of carbon may be used, obtained by holding the pestle with which the paste is made over the gas for a moment. A trace of cadmium sulfid will produce a yellow tint. (*Year-Book of Pharmacy and Dublin's Medical Press*.)

Dr. Stanton, in a discussion before the District Dental Societies

of New York, said that the reason Dr. Butler found dentin under cement fillings to be hypersensitive was because he took out fillings that had been inserted by other dentists, and that had remained so long that decay had begun beneath them. He had heard Dr. Butler reiterate this assertion so often that he wanted to say he often put cement fillings in teeth to obtund sensitive dentin. He asked all present who believed that cement fillings would obtund sensitive dentin to hold up their hands. All held up hands except Dr. Butler.

Dr. Butler said that when he stated that dentin was hypersensitive under cement fillings, he meant those which had been in for some time. (DENTAL COSMOS, 1898, xl, p. 385.)

Dr. H. S. Lowry, of Kansas City, Mo., states that a semi-liquid cement, when placed in the cavity of a tooth, performs its first function of usefulness by aiding very materially in the holding of the amalgam at the mouth of the cavity preparatory to pressing it home, obviating the necessity of holding it in position by other means less convenient. The amalgam is forced through the center of the cement, which then exudes at the periphery of the cavity and which should be brushed away before inserting a second piece, and the brushing away process continued after the insertion of each piece until the cavity is filled. It matters little, with this sort of filling, what kind of amalgam is used, or whether its tendency to shrink is much or little, for as a theory that practical tests have demonstrated, Lowry holds that the adhesive property of the cement, or its adhesive attachment, both to the amalgam and to the walls of the cavity, exerts such a tenacious influence over the crystallization of the amalgam that it prevents the slightest contraction or shrinkage. (DENTAL COSMOS, 1898, xl, p. 414.)

Dr. J. Leon Williams, of London, gives what he calls a "broad outline sketch" of what he would regard as a scientific method in the testing of the various cements now on the market. He would make a dozen or twenty mixtures of each cement, in which there should be varying proportions of powder and liquid, determined by accurate methods of weighing. These mixtures should be formed into cylinders of, say three-quarters of an inch in length and one-third of an inch in diameter. This form, or something approximating to it, would, he thinks, be found the best for the various tests. He would submit the cylinders of the various mixes to crushing tests; to a grinding test in which the cylinders should be forced against a wheel by means of a spiral spring, the wheel being driven by some power capable of being perfectly graduated or determined. He would further test these cements with reference to the action upon them of the products of acid and alkaline fermentation. Out of a hundred or more cements tested, probably half a dozen would be found superior to all others. Hence, superior cements would be adopted by the profession, with great benefit to the patient and to the profession itself. (DENTAL COSMOS, 1899, xli, p. 220.)

Another cement is described by Dr. Rostaing, consisting of pyrophosphate of barium and calcium with that of zinc and magnesium,

made by fusing together in a crucible calcium phosphate and zinc phosphate, pouring out the mass, powdering, dissolving in dilute phosphoric acid, and evaporating to a syrupy consistence. The liquid is mixed with a powder prepared by triturating three kilograms of zinc oxid with from five to thirty grams of boric acid and a little water; the mass is dried, heated to redness for a few hours, and, after cooling, is powdered. For use, the powder is formed into a paste with water. (*Dingler's Polyglot Journal*.)

A powdered oxyphosphate is described by pouring nitric acid on zinc oxid and stirring until effervescence ceases; after a few hours, heat in porcelain crucible until red vapors cease; then raise to a white heat and cool gradually, allowing from six to ten hours. The crucible will require to be broken away from the hard, strong mass inside, which when powdered and very finely pulverized, constitutes cement powder. Mix this powder with syrupy phosphoric acid for use. No doubt finely powdered silica or other materials of the same nature are also added by various manufacturers. (*British Dental Journal*.)

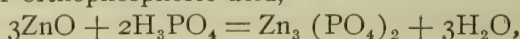
Another cement is made of freshly calcined zinc oxid, nine parts; finely powdered borax, one part; finely powdered silex, two parts; all mixed well together. A correspondent of the *Druggist* states that this makes a firm, plastic mass, and that it is used by French and German dentists. (*Dingler's Polyglot Journal*.)

Dr. E. Stark, Amsterdam, Holland, says that after a careful study of all the available literature on cement, he concludes that the various authors may be divided into two classes: First, those who know how to prepare a cement, but systematically keep the process secret, and merely publish experiments in shrinkage, expansion, solubility, and resistance to physical and chemical agents, for the purpose of advertising the article they have put on the market by a quasi-scientific discussion of its merits. Second, those who, no doubt with the best intention of benefiting their colleagues, give detailed descriptions of various methods of preparing cement, but evidently take their information at second-hand, for he says he has never been able to produce a cement by following their directions. His want of success in this line convinced him that these authors have been misled by the wholly or partially false statements of men who find it more to their advantage to keep secret the correct mode of preparation.

By adding a quantity of sublimated zinc oxid to the oxid obtained from zinc nitrate and mixing the powder with phosphoric acid, Stark was greatly gratified in getting a cement which, to all appearances, possesses the following properties:

1. It adheres firmly to the walls of the tooth, for it sticks fast to the glass on which it is mixed.
2. It offers great resistance to mechanical agencies, for it is hard without being brittle.
3. It is comparatively insoluble, for the acid reaction ceases to be perceived by the tongue after a very short time.

Instead of orthophosphoric acid,



meta or pyrophosphoric acid, or a combination of the three acids, may be tried. A small quantity of zinc oxid may first be dissolved in the warm acid; basic or neutral phosphate of zinc may be mixed with the powder, or pulverized glass or porcelain added to it. (*Deutsche Monatsschrift für Zahnheilkunde.*)

From this it is evident that even up to the present time we have not known the composition of the so-called zinc oxyphosphate cements. Hence we chose a number of standard oxyphosphates as a good basis for our research. We also made up samples from pure zinc oxid and glacial phosphoric acid. Upon studying the properties of these we found them to consist of a mixture of zinc oxid, or phosphoric acid, and zinc phosphate. Furthermore the term zinc oxyphosphate is a misnomer. Upon looking through the chemical literature we find no such substance described. The phosphoric acid used in cements is perhaps a mixture of meta-, pyro-, and ortho-, or ordinary phosphoric acids, with the latter in large excess. Meta- and pyrophosphoric acids easily take up water, and especially upon heating, to form the ortho-acid. In forming the cements the zinc salt is very nearly pure zinc orthophosphate, as our analyses show.

Upon mixing zinc oxid and glacial phosphoric acid a chemical action takes place with the formation of zinc phosphate, and any excess of either zinc oxid or phosphoric acid remains inclosed in the mass.

We have made up cements with an excess of zinc oxid, and also some with an excess of phosphoric acid. The former solidify much more quickly than the latter. These were made up in about the same way as we employ in making fillings in the teeth, and have about the same properties. When the phosphoric acid acts upon the zinc oxid quite a large amount of heat is generated:



The glacial phosphoric acid of commerce has quite a large amount of water in it, and hence we have the extra molecule of water for the above reaction. When one of these cements is dissolved in HCl and this solution is made slightly alkaline with ammonia, zinc phosphate is precipitated as a finely crystalline powder, having all the properties of normal zinc phosphate described in Dammer, the reference book of inorganic chemistry. It is easily soluble in even dilute strong acids, such as hydrochloric and nitric, and somewhat soluble in concentrated weak acids, as acetic, butyric, etc. Concentrated ammonia dissolves the substance to some extent, but in dilute ammonia, or dilute weak acids, it is very insoluble. Hence, the above is an easy method of separating the zinc phosphate from the rest of the cement,—for zinc oxid, or, of course, phosphoric acid, would not be precipitated under these conditions.

To be certain that no zinc hydroxid was brought down mechanically by the zinc phosphate, we redissolved the zinc phosphate in HCl rendered alkaline with ammonia, and then slightly acid with acetic acid. Under these conditions any zinc hydroxid would be kept in solution. Furthermore, the zinc phosphate thus precipi-

tated not only had the physical properties of that given in Dammer, but also, chemical analysis showed it to be identically the same substance.

We analyzed quite a number of samples of this zinc phosphate obtained from the cements, and in all cases obtained good results.

The following are typical samples:

1. $\text{Zn}_3(\text{PO}_4)_2 \cdot 4\text{H}_2\text{O}$ from sample of cement with excess of H_3PO_4 . Heating fifteen hours at 170°C ., 1.3724 gr. gave off 0.2125 gr. H_2O .

2. $\text{Zn}_3(\text{PO}_4)_2 \cdot 4\text{H}_2\text{O}$ from sample of cement with excess of ZnO . Heating twenty hours at 180°C ., 1.1005 gr. gave off 0.1719 gr. H_2O .

No. 1. 0.1825 gr. gave 0.0902 gr. $\text{Mg}_2\text{P}_2\text{O}_7$.

No. 2. 0.1376 gr. gave 0.0672 gr. $\text{Mg}_2\text{P}_2\text{O}_7$.

Analysis of $\text{Zn}_3(\text{PO}_4)_2 \cdot 4\text{H}_2\text{O}$:

<i>Theoretical.</i>		<i>Found.</i>	
		No. 1.	No. 2.
H_2O	15.73 per cent.	15.48 per cent.	15.67 per cent.
PO_4	41.46 "	42.18 "	41.67 "

This acetic acid and ammonia filtrate contains the excess of zinc oxid, or of phosphoric acid. By making alkaline and adding magnesia mixture the presence of any phosphoric acid will be shown by a precipitate of magnesium-ammonium phosphate, which can be filtered off. If then we add ammonium sulfid to the filtrate the presence of any zinc remaining in solution will be shown by a white precipitate of zinc sulfid.

We treated several different samples according to this method. In one, after the zinc phosphate was precipitated and filtered, the filtrate gave a precipitate with magnesia mixture, but none with ammonium sulfid. This shows, first, that no zinc phosphate was left in solution, for in that case we should get a precipitate of zinc sulfid and also of magnesium-ammonium phosphate. It shows, secondly, that only phosphoric acid was in solution. Hence, this cement was composed of zinc phosphate and phosphoric acid, or was a cement with an excess of phosphoric acid. Or, to give quantitative results, 0.7900 gr. of this cement gave 0.7545 gr. $\text{Zn}_3(\text{PO}_4)_2 \cdot 4\text{H}_2\text{O}$ and 0.0430 gr. H_3PO_4 , or a total of 0.7975 gr., which is very close work.

Another cement, when analyzed according to this method, was composed of zinc phosphate and zinc oxid, containing no free phosphoric acid: This was proved as follows: When the zinc phosphate was precipitated and filtered and the filtrate treated with magnesia mixture, no precipitate of magnesium-ammonium phosphate was formed, showing conclusively that neither phosphoric acid nor zinc phosphate was in solution; but when treated with ammonium sulfid it gave a heavy white precipitate of zinc sulfid. As zinc oxid is soluble in ammonium salts, or in ammonia or dilute weak acids, it remained in solution when the zinc phosphate was precipitated, and afterward came down as a sulfid when the ammonium sulfid was added. This cement, consequently, was composed of zinc phosphate and zinc oxid. To give quantitative

results, 1.1730 gr. gave 0.8853 gr. $\text{Zn}_3(\text{PO}_4)_2 \cdot 4\text{H}_2\text{O}$, and 0.2115 gr. ZnO .

By taking the component parts in the right proportions we could doubtless get a cement which is practically pure zinc phosphate.

Hence, from the above it is quite evident, as was borne out by our analyses, that the various samples are varying mixtures of zinc phosphate and other substances that might be present, such as ZnO or H_3PO_4 .

We analyzed a number of these cements according to the above method and got good results in all cases, the above being merely examples of the method.

The cements of commerce are not pure, as has been shown in a paper I read before the Chicago Dental Society in 1899. Chemical analysis gives the following impurities: arsenic, antimony, lithium phosphate, porcelain, borax, boric acid, calcium pyrophosphate, cadmium sulfid, carbon, fluorhydric acid, nitric acid, sodium carbonate, powdered glass, silex and water-glass, sodium borate, magnesium oxid, magnesium nitrate, sodium phosphate, silicate of alumina, phosphate of alumina.

These substances are generally very soluble in acids. Essentially, these cements are zinc phosphate with these and other impurities. Hence, a cement of pure zinc phosphate should last much longer than the cements of commerce.

Having thus established for all time the composition of zinc-oxid-phosphoric-acid cements, we next turn to the second part of the problem,—the

DETERMINATION OF THE AMOUNT AND KINDS OF ACIDS OR ALKALIES PRODUCED BY THE COMMON BACTERIA OF THE MOUTH WHEN LIVING UPON CERTAIN FOODSTUFFS.

To render the experiments uniform we grew cultures of these bacteria on two different media:

(1) *Witte's peptone*, together with glucose and a small admixture of sodium sulfate, sodium phosphate, and sodium chlorid, forms an excellent medium for the growth of such bacteria as *B. acidilactici*, *Sarcina lutea*, *Sarcina aurantia*, *Staphylococcus pyogenes aureus*, *B. coli communis*, etc.

This medium is a typical example of the mixture of the food-stuffs which we eat. The albumin furnishes the nitrogenous substances, some sulfur compounds, etc., and these together with the glucose and inorganic salts give us an excellent food.

(2) *Asparagin*, when mixed with glucose or lactose together with sodium sulfate, sodium phosphate, and sodium chlorid, gives us another excellent medium for bacteria.

Solutions of different concentration were made up and inoculated with the various bacteria, and these produced acids of various concentration in the different media. Some of the media were inoculated with pure cultures of the above-mentioned organisms, while others were inoculated with cultures taken from typical examples of certain diseases of the teeth. These we shall speak of later. In nearly all cases the cultures became contaminated

to some extent, and it was noticed that a mixed culture of a number of organisms generally gave a stronger acid solution.

The strength of the acid was determined as follows: Each solution at the beginning was one liter in volume and was kept at a constant temperature of 37° C., or body temperature. At the end of each twenty-four hours 10 c. c. of medium were removed by means of a sterilized pipette, and the amount of acid was determined by titration with deci-normal sodium hydrate; the amount of acid increased gradually until at the end of from seven to fourteen days it became constant, and the bacteria commenced to degenerate. The amount of acid produced in any case is so small that we could not work with the original solution to determine the kinds of acids, as it is too dilute. The entire liquid was then distilled and the distillates made alkaline and evaporated to dryness. Upon acidifying with sulfuric acid and distilling the organic acids were liberated and were tested for qualitatively.

Among those present were acetic, lactic, butyric, valerianic, carbonic, formic, and hydrogen sulfid, as well as others which we could not identify. The lactic acid was tested for by Wessener's modification of the Boaz method, which appeared in *Medicine*, January, 1896, vol. 1, No. 3. (We wish here to thank Professor Jno. A. Wessener for many courtesies,—the greater part of this work having been done in the Columbus Memorial Laboratory.) The formic acid was detected by its well-known property of forming a silver mirror when treated with an ammoniacal solution of silver nitrate. The acetic, valerianic, and butyric acids were recognized by their own characteristic odors, as well as those of their esters. The hydrogen sulfid was recognized by its odor and by the property of blackening lead acetate paper. In the case of one solution we determined the amount quantitatively as lead sulfid.

The peptone media were made up as follows: A weighed amount of peptone was dissolved in 500 c. c. of water and brought to boiling. Some albumins were precipitated and filtered off. The glucose was added, together with some sodium phosphate, sodium chlorid, and sodium sulfate, and the whole diluted to one liter, and sterilized at 100° , and again in twenty-four hours. We made titrations of these original solutions and found them to be slightly acid in all cases. Phenol-phthalein was the indicator used in all experiments.

The following six solutions contained 20 gr. Witte's peptone, 10 gr. glucose, 0.7 gr. Na_2HPO_4 , 0.7 gr. NaCl , and 0.7 gr. Na_2SO_4 . Pure cultures of *B. acidi lactici*, *Staphylococcus pyogenes aureus*, *Sarcina lutea*, *Sarcina aurantia*, and *B. coli communis* were kindly furnished by Dr. Jordan and Dr. Davies, of the Bacteriological department of the University of Chicago. We thank these gentlemen for the kindly interest and advice tendered in this work.

Cultures were taken from typical cases of diseases of the teeth. For instance, No. 6 was taken from a boy seven years of age, from a cavity at the cervical margin under an old cement filling. No. 12 was taken from a woman's mouth in which every tooth was decayed at the cervical margin from molar to molar on both jaws;

cement fillings would only last about six months; saliva decidedly acid; age about forty-two years. The spoon excavator was sterilized and the decay under the cement filling and at the cervical margin of the cavity was removed and the tube inoculated. No. 13 was that of a man seventy years of age. The gums were receded and the cementum was well exposed and the cavity running from enamel well up into the cementum. This cavity had been previously filled with cement. The same precaution was taken as before.

All these cultures were examined from time to time by Dr. Geo. W. Cook, and reports were given us by him. We wish to thank him for the many favors shown us in this work.

After the solutions were inoculated with the culture they were kept at a constant temperature of 37° C., and titration of the acid was made each twenty-four hours. In some cases quite a large amount of gas, probably CO_2 , was formed, and hence in all titrations we carried duplicates. The first was titrated in the cold; the second was brought to boiling to eliminate any CO_2 , and cooled and titrated. Generally the amount of acid in the second case was smaller, but in some cases there was a "decided increase in the amount of acid upon boiling." This may be accounted for as follows:

As is well known, the sugars are polyatomic alcohols, and as such form esters with the organic acids. These esters are neutral, but upon boiling with water they could be saponified into the sugar and acid. We have here exactly the conditions under which such action could take place. The organic acids formed by the bacteria could unite with the glucose present and form glucosids or esters; these when titrated with alkali in the cold would not show the acid united with the glucose, but when boiled, and hence saponified, would then upon titration show a decided increase in acidity.

We now give a table of the different cultures and the amount of acid they contained from day to day:

No. 1. *Bacillus acidi lactici*, in two per cent. peptone, one per cent. glucose, Na_2SO_4 , Na_2HPO_4 , NaCl , as given above; volume 1 liter. Original solution was acid; 5 c.c. original solution = 0.5 c.c. deci-normal NaOH .

1st day.	5 c.c. = 1.57 c.c. deci-normal NaOH ; boiled = 1.44 c.c.
2d "	" 1.70 " " " 1.40 "
3d "	" 1.65 " " " 1.45 "
4th "	" 1.77 " " " 1.66 "
5th "	" 1.81 " " " 1.50 "
6th "	" 1.65 " " " 1.60 "
7th "	" 1.85 " " " 1.68 "
8th "	" 2.00 " " " 1.70 "
9th "	" 1.80 " " " 1.75 "
10th "	" 1.70 " " " 1.70 "

Examination showed the culture to be pure on the third and ninth days, so we may assume that we had pure cultures throughout the time.

No. 2. *Staphylococcus pyogenes aureus*, in same solution as above:

1st day.	5 c.c. = .94 c.c. deci-normal NaOH; boiled = .82 c.c.
2d "	" " 1.15 " " " " 1.05 "
3d "	" " 1.35 " " " " 1.20 "
4th "	" " 1.40 " " " " 1.20 "
5th "	" " 1.20 " " " " 1.30 "
6th "	" " 1.50 " " " " 1.25 "
7th "	" " 1.40 " " " " 1.30 "
8th "	" " 1.40 " " " " 1.39 "
9th "	" " 1.30 " " " " 1.35 "

No. 2 was examined on the third and ninth days, and was found to be a mixed culture with staphylococcus in excess.

No. 3. *Sarcina lutea* in same solution as above:

1st day.	5 c.c. = 1.00 c.c. deci-normal NaOH; boiled = .94 c.c.
2d "	" " 1.83 " " " " 1.60 "
3d "	" " 1.95 " " " " 1.83 "
4th "	" " 1.90 " " " " 1.70 "
5th "	" " 2.00 " " " " 1.75 "
6th "	" " 1.85 " " " " 1.85 "
7th "	" " 1.40 " " " " 1.30 "
8th "	" " 1.65 " " " " 1.94 "
9th "	" " 1.75 " " " " 1.79 "

No. 3 was examined on the third and ninth days, and was found to be a mixed culture.

No. 4. *Sarcina aurantia*, in the same medium as above:

1st day.	5 c.c. = .66 c.c. deci-normal NaOH; boiled = .52 c.c.
2d "	" " 1.00 " " " " .88 "
3d "	" " 1.20 " " " " .97 "
4th "	" " 1.30 " " " " 1.25 "
5th "	" " 1.25 " " " " 1.24 "
6th "	" " 1.45 " " " " 1.00 "
7th "	" " 1.50 " " " " 1.68 "
8th "	" " 1.60 " " " " 1.60 "

No. 4, at the end, was a mixed culture with staphylococcus in excess.

No. 5. *B. coli communis*, in the same medium as above:

1st day.	5 c.c. = .65 c.c. deci-normal NaOH; boiled = .57 c.c.
2d "	" " .83 " " " " .75 "
3d "	" " 1.00 " " " " .95 "
4th "	" " 1.30 " " " " 1.05 "
5th "	" " 1.55 " " " " 1.15 "
6th "	" " 1.50 " " " " 1.40 "
7th "	" " 1.50 " " " " 1.60 "
8th "	" " 1.70 " " " " 1.60 "

This culture remained pure throughout.

No. 6. Culture taken from the boy seven years old; medium same as above:

1st day.	5 c.c. = .80 c.c. deci-normal NaOH; boiled = .80 c.c.
2d "	" " 1.20 " " " " 1.10 "
3d "	" " 1.20 " " " " 1.15 "
4th "	" " 1.80 " " " " 1.67 "
5th "	" " 2.18 " " " " 1.90 "
6th "	" " 2.40 " " " " 2.30 "
7th "	" " 2.45 " " " " 2.45 "
8th "	" " 2.60 " " " " 2.69 "
9th "	" " 2.78 " " " " 2.80 "
10th "	" " 2.80 " " " " 3.00 "
11th "	" " 3.03 " " " " 2.97 "

At the fourth day it had *B. pyogenes* Genicoccus, micrococcus, and budding fungi. At the eleventh day it had pure yeast fungi.

No. 7 was *B. acidi lactici* in 5 per cent. peptone, 3.8 per cent. glucose, and 0.5 per cent. each of Na_3PO_4 , NaCl , Na_2SO_4 .

1st day.	5 c.c. = 2.90 c.c. deci-normal NaOH; boiled = 2.75 c.c.
2d "	" " 3.95 " " " " 3.60 "
3d "	" " 3.55 " " " " 3.45 "
4th "	" " 3.70 " " " " 3.63 "
5th "	" " 3.64 " " " " 3.50 "
6th "	" " 3.75 " " " " 3.85 "
7th "	" " 3.75 " " " " 3.49 "
8th "	" " 3.80 " " " " 3.90 "
9th "	" " 3.68 " " " " 3.75 "
12th "	" " 4.78 " " " " 4.66 "
13th "	" " 5.67 " " " " 5.35 "
14th "	" " 5.70 " " " " 5.40 "
15th "	" " 5.84 " " " " 5.82 "
16th "	" " 5.70 " " " " 5.70 "
17th "	" " 6.00 " " " " 5.80 "
20th "	" " 6.40 " " " " 6.40 "

No. 7 remained a pure culture throughout.

No. 8 was *Sarcina lutea* in the same medium as No. 7:

1st day.	5 c.c. = 1.88 c.c. deci-normal NaOH; boiled = 1.50 c.c.
2d "	" " 1.80 " " " " 1.75 "
3d "	" " 3.20 " " " " 2.50 "
4th "	" " 3.00 " " " " 3.15 "
5th "	" " 3.15 " " " " 3.00 "
6th "	" " 2.95 " " " " . . . "
7th "	" " 2.95 " " " " 3.04 "
8th "	" " 3.05 " " " " 3.00 "
9th "	" " 2.97 " " " " 3.01 "
10th "	" " 3.00 " " " " 3.40 "
11th "	" " 2.95 " " " " 2.80 "
12th "	" " 2.90 " " " " 2.88 "
13th "	" " 3.00 " " " " 3.38 "
14th "	" " 2.70 " " " " 3.16 "
15th "	" " 2.80 " " " " 3.16 "
16th "	" " 3.00 " " " " 3.00 "

On the second day the culture was pure, but on the sixteenth day it was very much mixed, containing a large quantity of a micrococcus.

No. 9. Same culture as No. 6,—namely, the one from the boy seven years old,—and in same culture medium as Nos. 7 and 8:

1st day.	5 c.c. = 1.90 c.c. deci-normal NaOH; boiled = 1.45 c.c.
2d "	" " 1.80 " " " " 1.75 "
3d "	" " 2.20 " " " " 2.18 "
4th "	" " 3.15 " " " " 3.45 "
5th "	" " 3.30 " " " " 3.30 "
6th "	" " 3.20 " " " " 3.30 "
7th "	" " 3.35 " " " " 3.30 "
8th "	" " 3.25 " " " " 3.10 "
9th "	" " 3.35 " " " " 3.55 "
10th "	" " 3.16 " " " " 3.08 "
11th "	" " 3.38 " " " " 3.45 "
12th "	" " 3.20 " " " " 3.30 "

No. 9 had at least three different kinds of organisms.

No. 10. *B. acidi lactici* in a medium of 1 per cent. asparagin, 2 per cent. lactose, and 0.1 per cent. each of NaCl, Na₂SO₄, Na₂HPO₄.

This medium titrated as follows: 5 c.c. = 1.5 c.c. deci-normal NaOH.

1st day.	5 c.c. = 2.12 c.c. deci-normal NaOH; boiled = 2.03 c.c.
2d "	" " 2.00 " " " " 2.20 "
3d "	" " 2.50 " " " " 3.13 "
4th "	" " 2.15 " " " " 2.37 "
5th "	" " 2.09 " " " " 2.32 "
6th "	" " 2.00 " " " " 2.35 "
7th "	" " 1.75 " " " " 1.85 "

No. 10 remained pure throughout.

No. 11. *B. acidi lactici*, in the same medium as No. 10, except that glucose is substituted for lactose:

1st day.	5 c.c. = 2.00 c.c. deci-normal NaOH; boiled = 2.00 c.c.
2d "	" " 2.30 " " " " 2.28 "
3d "	" " 2.52 " " " " 2.50 "
4th "	" " 2.55 " " " " 2.45 "
5th "	" " 2.32 " " " " 2.63 "
6th "	" " 2.30 " " " " 2.45 "
7th "	" " 2.00 " " " " 2.40 "
8th "	" " 2.10 " " " " 2.30 "
9th "	" " 1.90 " " " " 1.75 "

No. 11 remained pure throughout.

No. 12. Culture taken from the teeth of a lady forty-two years old, the medium being the same as for No. 10.

1st day.	5 c.c. = 1.80 c.c. deci-normal NaOH; boiled = 1.81 c.c.
2d "	" " 1.84 " " " " 1.74 "
3d "	" " 2.00 " " " " 2.00 "
4th "	" " 2.70 " " " " 2.60 "
5th "	" " 3.40 " " " " 3.48 "
6th "	" " 3.25 " " " " 2.85 "
7th "	" " 3.10 " " " " 3.10 "
8th "	" " 3.00 " " " " 2.80 "
9th "	" " 3.20 " " " " 3.00 "
10th "	" " 3.20 " " " " 3.64 "
11th "	" " 3.00 " " " " 3.50 "

No. 12 was a mixture throughout.

No. 13. Culture taken from a man seventy years old, and in the same medium as Nos. 11 and 12:

1st day.	5 c.c. = 1.90 c.c. deci-normal NaOH; boiled = 1.73 c.c.
2d "	" " 2.30 " " " " 1.80 "
3d "	" " 2.04 " " " " 2.20 "
4th "	" " 2.10 " " " " 2.25 "
5th "	" " 2.22 " " " " 2.20 "
6th "	" " 1.60 " " " " 2.05 "
7th "	" " 1.70 " " " " 2.20 "
8th "	" " 1.80 " " " " 1.70 "
9th "	" " 2.00 " " " " 1.70 "
10th "	" " 2.30 " " " " 2.40 "
11th "	" " 2.00 " " " " 2.00 "

No. 13 is peculiar in that at the end it had a fine, nearly pure culture of leptothrix threads.

We will not go further into the details of the detection of the individual acids in each of the above solutions, as we shall con-

tinue this work and hope to present the results to you in the near future. Suffice it to say we have found lactic, butyric, valerianic, formic, carbonic, and hydrosulfuric acids, making special tests for each.

Although very weak, yet these acid solutions are sufficiently strong to dissolve cements easily. The strongest acid solution above is N/8,—*i.e.*, one-eighth of normal, while the others gradually decrease to about N/25. Hence, we took a solution of average strength, about N/12, a mixture of equal parts of acetic, lactic, butyric, and valerianic acids, and treated samples of cements with this.

1.6695 gr. of a Justi cement, when treated forty-eight hours with this mixture, lost 0.2066 gr. or 12 per cent. Of this 0.2066 gr. there were 0.1370 gr. of ZnO and 0.0540 gr. $\text{Zn}_3(\text{PO}_4)_2 \cdot 4\text{H}_2\text{O}$. This was proved by the method above described for separating the constituents of the cements, and does not need repetition.

1.2540 gr. of a sample of Ames's cement lost 0.1985 gr. in forty-eight hours when treated with the above acid mixture. Of this 0.1485 gr. was ZnO and 0.0490 gr. was $\text{Zn}_3(\text{PO}_4)_2 \cdot 4\text{H}_2\text{O}$.

A sample of Weston's cement lost 6 per cent. in seventeen hours; or, 1.6378 gr. lost 0.1005 gr.

A sample of cement made from pure ZnO and glacial phosphoric acid, when treated according to the above method, lost 47 per cent., or 1.6170 gr. lost 0.7605 gr., in forty-eight hours.

It must not be understood that these tests are to be taken as indicative of the standard of excellence of these cements, for the results of this paper show clearly that the excellence of any cement depends upon the varying amounts of ZnO and phosphoric acid used. In other words, the more zinc phosphate and the less free ZnO there is in a cement, the less likely it is to be dissolved by these organic acids. From the above figures it is seen that the free ZnO, or phosphoric acid, is the substance dissolved in greatest quantity.

In conclusion, we are perfectly justified in assuming that cement failure in the teeth can be attributed to the solvent power of the organic acids formed at the seat of decay by destruction of food-stuffs by the common bacteria of the mouth. If such bacterial fermentation takes place in a pocket beneath the gum-margin, hence at a place where the saliva does not constantly wash away the acids formed, these acids immediately attack the cements and dissolve them. Might we not also attribute the caries of the teeth themselves to the same cause?

$\text{Ca}_3(\text{PO}_4)_2$ is very similar to $\text{Zn}_3(\text{PO}_4)_2$ in properties, and certainly would be slowly dissolved by the acids formed in the seat of decay.

Above all comes the most important part of dental work: Keep the mouth clean; wash out as much as possible all bacteria and unused foodstuff, and then our teeth and our cement fillings will last longer.

Side by side with this, let us keep on experimenting, trying to find some suitable cement that will resist the action of organic acids, and thus we will benefit science and humanity.

THE PHYLOGENY OF THE FIFTH TUBERCLE OF THE LOWER SECOND MOLAR OF MAN.

BY ALTON HOWARD THOMPSON, D.D.S., TOPEKA, KANSAS.

(Read before the International Dental Congress at Paris, August 8, 1900.)

THE evolutionary history of man is one of the most interesting chapters in the whole book of nature. Although his phylogeny has not been as well worked out as that of the horse, for instance, yet there are many links in the chain that can be supplied and that throw light upon the pathway of his development, if not of his origin. As Professor E. D. Cope said:*

"The actual phylogeny or genealogy of organisms can only be positively determined by paleontological research. We have been able in this way to obtain numerous lines of descent of animals, and some general results as to the genealogic relations of primary types. The study of phylogeny shows that the evolution of life forms has been from the simple to the complex, and from the generalized to the specialized."

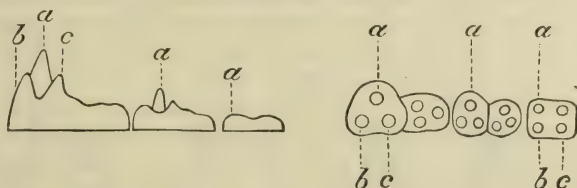
In this manner the phylogeny of man has been to an extent determined, but not with a specific certainty as to details. Like many other animals, only here and there do we discover evidence to indicate the pathway of his descent, where fragments have been preserved in accidental tombs in the rocks. The gaps in the chain leave much to be desired, although much that is suggestive has also been supplied by analogy and by the parallel lines of his ontogeny, or embryological history, and his taxonomy, or the parallelism of the zoological record. Much has been learned from this parallelism of the various branches as supplementing and illustrating phylogeny or the paleontological record. This has been done with the evolution of man to a degree that assists us in differential diagnosis, and adds to the evidence indicating the line of this descent with a clearness that is almost marvelous, and is a delight to the philosophic evolutionist. These studies take us into fields where the highest genius of our race has exercised its powers, and where great biological problems bearing upon the origin and destiny of our species have received illumination. The phylogeny of the human molar has there been made out, and through these discoveries light has been thrown upon the phylogeny of man, for in no set of organs is this better illustrated than in the teeth.

The life history of the teeth is written in imperishable lines upon their contours. Every tooth bears in its structure the evidence of its descent, which, if read aright, instructs us not only in the phylogeny of these organs, but collaterally throws light upon greater problems. This is beautifully illustrated in the molar teeth, whose evolution has been so wonderfully elaborated and worked out by our great paleontologists, so that the life history of the molar teeth has been made out with approximate certainty. This is no mere fanciful hypothesis, but the claim is supported by indisputable paleontological evidence.

*"Factors of Organic Evolution," p. 74.

The present forms of the molars of man are quite primitive. These forms are further elaborated in the specialized teeth of other mammals by the addition of other cusps and tubercles, but the phylogenetic history of the molar cusps of even the higher forms can be traced with considerable accuracy through the various steps of their evolution from early geological times.

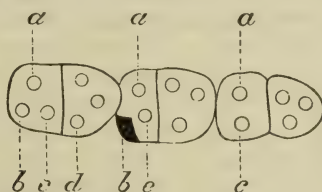
FIG. 1.



REDUCTION OF THE TRIGONID TO THE LEVEL OF THE TALONID.
a, *a*, Protoconid. *b*, *b*, Paraconid. *c*, *c*, Metaconid.

The lower molars are more complicated than the uppers in man, for we have in the latter the simple trigon with the heel added to carry the fourth tubercle, which makes the simple quadrituberculate type, as found far back in geological ages. The upper human molar is, indeed, quite primitive and archaic. The lower molar, however, is more complicated, as it has, in the first place, lost one tubercle, the paraconid, from the primitive trigonid, and the heel or talonid supports three tubercles. (Figs. 1 and 2.) This is quite unique, and makes a distinct type from the upper molar. As Professor Osborn remarks* (in discussing a paper of Rösse's):

FIG. 2.



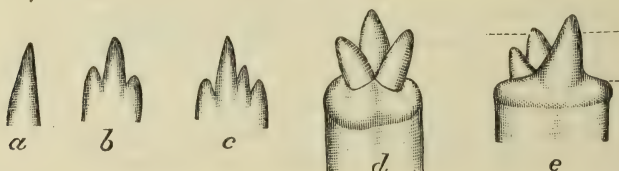
LOSS OF THE PARACONID (*b*) ON THE HUMAN LOWER MOLAR.
 (Cones indicated as before.)

"The embryological history of the lower molar approximately reflects the ancestral history, but the upper molar does not repeat its history in the same way. We can follow the transformation of the single-fanged reptilian tooth (*a*, Fig. 3), such as we see persisting in the cetacea, into the low-crowned human molar. The first departure toward the development of lateral cusps is seen in the Triassic *Dromotherium* (*b*, Fig. 3). The second step is in a contemporary form with the preceding, the *Micronodon* (*c*). 'These are triconodont forms.' The third step is where the cones have

*"The History and Homologies of the Molar Cusps," Proc. Am. Museum Nat. Hist. 1892, p. 740.

assumed the triangle, as in the Jurassic *Spalcotherium* (*d*). In the fourth stage, as in the *Amphitherium* (Jurassic) (*e*), besides the three cusps of the primitive triangle, we have the first cusp of the talonid, the hypoconulid. In the *Miacis* of the lower Eocene (Fig. 1) the internal and crown views show how the primitive anterior portion of the lower molar crown, the trigonid, was reduced to the level of the posterior portion, the talonid, while retaining all of its cusps. The next step was that of the lower molar of the *Anaptomorphus*, the oldest monkey or lemur known, 'and probably the

FIG. 3.



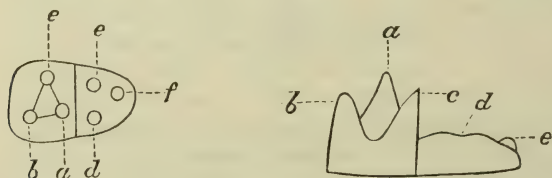
EVOLUTION OF THE LOWER MOLAR AS ILLUSTRATED BY ACTUAL FOSSIL FORMS.

- a.* Shows protoconid, as illustrated in the reptiles and cetacea.
- b.* Triassic *Dromotherium*, the triconodont form.
- c.* *Micronodon*.
- d.* Jurassic *Spalcotherium*, the triangular form.
- e.* *Amphitherium*.

ancestor of all of the primates,' which illustrates the loss of the antero-internal cusp or paraconid (*b*, Fig. 2), which is present as a rudiment in 1 m and 2 m, but is absent in 3 m. This accounts for the history of all of the cusps of the human lower molar. Thus in the rich series of the Mesozoic and lower Eocene mammals we can observe the actual rise, succession, and decline of all the six cusps."

"Molar crowns are divided into two regions: First, the elevated primitive triangle (trigon), the cutting, piercing, or sectorial portion, and, second, the depressed heel (talon), with a primitive

FIG. 4.



DEVELOPMENT OF THE HEEL OR TALONID ON THE LOWER MOLAR.

- a.* Protoconid. *b.* Paraconid. *c.* Metaconid. *d.* Hypoconid. *e.* Entoconid. *f.* Hypoconulid.

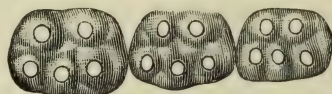
crushing or grinding function. In an early stage the upper and lower molars were simple triangles of cusps, as in the Cape mole. The first step toward the crushing function was the development of the hypoconid upon the incipient talonid (*d*, Fig. 4), which is later reinforced by two more cusps, the entoconid (*e*) and the hypoconulid (*f*). The entire heel or talonid is complete upon the lower molar before it commences to develop upon the upper molar, as in *Anaptomorphus* and as shown in its ontogeny. (Survival of the triangular form of the upper molar is shown in the opossum and

other insectivora, and occasionally in man.) Upon the upper molar the talon is only developed in bunodont types, such as the primates and ungulates, to still further increase the crushing area of the crowns. The lower molars early acquire the greatest extension of the talonid while retaining all the elements of the trigon. The primitive anterior lingual cusp, the paraconid (*e*, Figs. 2 and 4), has degenerated in the primates (except in a few lemurs) while it persists in *Didelphys*. It is not seen in the human lower molar at all, 'the trigonid supporting only the protoconid, the antero-buccal cone (*a*), and the metaconid (*c*), which now becomes the antero-lingual cone or cusp.' Its declining stages mark the loss of the sectorial function, and can be readily followed in the lemurs and fossil monkeys; it degenerates while the hypocone of the upper molar develops. The antero-buccal cusp is the hypoconid (*d*). The distal or postero-distal cusp is called the hypoconulid (*f*), which is the fifth cusp (leaving out the paraconid, but with that the sixth cusp) of the present lower human molar. This cusp is almost universal among lower Eocene mammalia; in the last lower molar it forms the additional lobe. It is found strongly developed in many of the higher primates."

The study of the hypoconulid and its loss from the second lower molar of man is thus fraught with profound interest, as showing the pathway by which it attained its perfection and then degenerated. Approaching the phylogeny of this tooth through the Insectivora, and later on through the Lemuridæ, we find evidence illuminating the subject that is very valuable and interesting. In the Insectivora we find that the cusps and ridges of the lower molars are arranged in the well-known "W" pattern, the sharp, high ridges being connected by oblique and cross ridges. This is a higher type of molar than is possessed by man, in whom the tubercles are low and rounded and the connecting ridges are lost. After the insectivorous type we find the tubercles reduced and the arrangement changed in the lower primates, the principal type being that of transverse ridges connecting the four or six tubercles. This is a common type among the lemurs and the lower quadrumana generally. There is here a reduction of the lower molars from the insectivorous type. This form of lower molar is preserved and passed upward through the quadrumana, appearing with more or less regularity up to the highest apes. In some of the Simiadæ the elongated lower molar appears. By an extension of the heel or talonid the crown becomes greatly elongated backward, supporting two or three tubercles. This type follows a progressive evolution until the transverse ridges are dropped and the entire occlusal surface is extended into an oval or round, more or less deep, fossa. The triangular ridges descending from the tubercles are not marked in the lowest primates, but are developed to a greater extent in man, especially in the higher races. A marked characteristic of the molars of the quadrumana is this wide, round fossa, which is sometimes quite deep. This is marked in the apes, and next above them in the lower races of man. The large triangular ridges seem to be a higher type, and do not appear at first

in as marked a degree in the low races of man. In many low races the occlusal fossa extends from side to side, the ridges are nearly absent, and the surface is wide and smooth. In the orang this fossa is wrinkled and shallow. In the macaques and others of the quadrumana the lower molar begins to assume the human type, although much elongated, the heel or talonid extending backward quite markedly, and is quite constricted transversely as compared with the anterior portion or trigonid. In the lemurs and lower monkeys the high trigonid and low talonid is a marked feature. In the lower apes, the gibbon and orang, the crown is very much elongated, the five tubercles being well marked in all three of the molars, three on the buccal line and two on the lingual. In the chimpanzee and gorilla the crowns are shortened somewhat and more human, but still have the five tubercles well marked. In some of the apes the second molar is larger than the first, with a large hypoconulid or fifth tubercle. In the primates the lingual marginal ridge is most conspicuous, the tubercles being high and sharp, while the buccal ridge and tubercles are low and rounded. This has reference, of course, to its adaptation to proper articulation with the opposing

FIG. 5.



QUINETUBERCULAR LOWER MOLAR, AS FOUND IN THE APES AND LOW HUMAN RACES.
(Each of the three molars has five tubercles.)

upper molars. In the adult individuals the points of the tubercles are usually worn away so as to present five cupped-out, abraded spots in the location of the tubercles. This is very apparent in the molars of the higher apes in adult specimens, so that young individuals must be taken in order to study the cusp pattern, as this is usually obliterated in older skulls.

In all of the higher apes the quinetubercular structure is constant and characteristic in all of the lower molars. The third may be slightly reduced, but never to the extent that the upper third presents in the chimpanzee. It is usually of full pattern with the other molars, and sometimes is larger. This persistence of the fifth tubercle extends also to the lower and savage races of man, in whom the presence of the fifth tubercle is almost constant. There begins to be manifested in them, however, in the second lower molar that absence of the fifth tubercle which marks this tooth as being degenerate in the higher races. The fifth tubercle is dropped from the second molar before it disappears from either the first or the third. In fact, it is never absent from the first in any of the Anthropoidæ, man or apes, and is usually present in the third in all races of man. Though sometimes absent in the higher races, it is rarely so in the lower. Therefore it is more constant in the third than in the second molar. It does not show the same progressive degeneracy as the hypocone of the upper molar, which, with its supporting talon, is strongly developed in the first molar, is reduced

in the second, and is absent in the third, as a rule, in the higher races. This, the fourth, cone is rather homologous with the hypoconid below, the fourth tubercle, which is present in all of the lower molars, except that it is occasionally absent in the third, leaving this a trituberculate tooth like the upper third molar. On the contrary, the hypoconulid, the fifth tubercle of the lower molar, is present constantly only in the first molar, varies somewhat in the third, and is absent habitually in the second molar in the higher races. Hence it is not the homologue of the hypocone above, but of the hypoconule, the fifth cusp or cingule, which sometimes appears upon the lingual face of the upper first molar and occasionally upon the third, but very rarely or never on the second, thus showing analogous characteristics as to the locations of its appearance,—*i.e.*, the first and second molars, which compares with the hypoconulid below. The fifth tubercles, both above and below, are therefore homologous.

In the higher races of man the fifth tubercle or hypoconulid is habitually absent from the second lower molar,—*i.e.*, it appears very infrequently in individuals of the European races, though it is sometimes found in strong individuals with exceptionally rugged and savage structure. As a rule it is absent, however, and the occlusal surface of the tooth presents the well-known four-cusped pattern, with the cruciform sulci between the tubercles. The triangular ridges are usually so well developed as to obliterate the round fossa of the face, which is characteristic of the first molar and of all the lower molars in the lower races and the apes. As we pass downward in the scale and approach the lower races and savage peoples, both ancient and modern, we find this tubercle occurring more frequently, and in the very lowest races it is almost constant. It is always present in fossil Europeans, all Mongols, Mound-builders and Shell-heapmen, and other aboriginal Americans; Maoris, Australians, nearly all Negroes and Eskimos, Veddas, Malays, Ainos, and all other aboriginal and savage peoples.

It is absent with more or less constancy in races that were more or less civilized, both ancient and modern. Thus it is generally absent in the ancient Etruscans, Egyptians, Assyrians, Greeks, Romans, Aztecs, Peruvians, and others who were somewhat refined in their living and degenerate in structure. In modern semi-civilized races, Arabs, Hindoos, Japanese, living American Indians, etc., and in all highly civilized or European races it is constantly absent, except in occasional individuals who revert to primitive and savage strength and perfection of structure.

It is found regularly in lower races who approach the ape in structure, and on account of its constancy in the apes is an ape-like survival, being often connected with other simian features, like prognathism, receding chin, etc. In the higher races the absence of this tubercle from the lower second molar is a sign of remoteness from our simian ancestors, but it is also the mark of degeneracy, and points to physical degradation. The fifth tubercle below is the first to fall in the progressive evolution of the lower molars. In the upper molars the fifth tubercle has been lost from

all of them, and the fourth is now inconstant and is being gradually aborted. The fourth is still present below, so that the lower molars are yet more perfect. In the constancy of this degenerate feature the second lower molar follows next to the upper lateral incisor in progress of maldevelopment, which in turn is exceeded only by the third molar.

It may possibly be exceeded by the upper second molar, which frequently drops the hypocone and becomes tritubercular. Sometimes the upper first molar also takes on this form, and this trituberculism of the upper molars happens most frequently in the Latin races, as pointed out by Professor Cope some years since,* and is an especial mark of degeneracy. The second lower molar is more constant in its type than the upper second, and when it does vary it is in the direction of reversion,—*i.e.*, the reproduction of the lost fifth tubercle. It is not so degenerate as the upper molar, and has not progressed so far along on the pathway toward the evolution of a simpler type, for the reason probably that the talonid of the lower molar was the first formed, and the upper talon, being the youngest and least stable, was the first to succumb to suppressive agencies, according to well-known laws.

Summary.

1. The evolutionary history of man is most interesting, although many links yet remain to be discovered to complete the chain of his descent.

2. The life-history of the teeth is written on their contours, and the study of tooth evolution has also thrown light upon other great biological problems.

3. Paleontological research has demonstrated the truth of the hypothesis of tooth evolution which claims that cusps are direct upgrowths from the crown, and not the fusion of separate cones.

4. The original and primitive form of tooth was that of the simple single cone, from which all other teeth, even the most complex, were derived by duplication and modification.

5. The genetic elements of the molar teeth are named with reference to their evolution, succession, and modification, which has been well made out.

6. The human molars are archaic in type, the forms being found far back in geological times; and the lower molars are more complex than the uppers. The evolution of the lower molar from the simple cone has been followed out in fossil forms, so that its phylogeny is complete.

7. The study of the fifth cusp of the lower molar is fraught with peculiar interest, as showing the pathway of its evolution and then of its degeneracy. Its history can be traced through lower forms up to man.

8. The lower molars present distinct types in the course of their evolution up to the higher apes and man. They vary also between the lower and higher races of man in regard to the occlusal surface.

**American Naturalist*, 1886, p. 541.

9. The five tubercles are found in all of the lower molars of the apes and the low human races.

10. The fifth tubercle is constant in the apes and the low races of man, hence is an ape-like feature, like prognathism, etc.

11. The fifth tubercle below is homologous with the fifth above, although the latter is almost entirely lost. It is not homologous with the fourth above, the hypocone, although the latter is rather erratic.

12. The fifth tubercle is found almost constantly in the lower human races, but is absent in the higher European races, except in individuals of strong and savage structure. It is absent in all civilized peoples, both ancient and modern.

A SIMPLE AND EFFECTIVE APPLIANCE FOR EXPANSION OF THE INFERIOR MAXILLA.

BY DR. G. DOUZILLE, AGEN, LOT-ET-GARONNE.

(Read before the Third International Dental Congress at Paris, August 8, 1900.)

WE are perpetually meeting with unsolved problems in all branches of our profession. In my case it was the question of devising a simple and effective appliance for the expansion of the inferior maxilla; and as I was asked by our secretary-general to discuss this question, I have tried to do it in the most acceptable manner.

We must first admit that in the mechanism of regulating a tooth the pressure of the root results in the development of the activity of two different kinds of cells: First, the osteoclasts, which act against the compressed alveolar wall and bring about its resorption; and, second, the osteoblasts, which exercise their activity in the opposite wall and furnish a quantity of osseous tissue to correspond to the space produced by the movement of the root.

This theory is very acceptable, as it seems to be the only true and simple one; but I do not know of any experiment which would demonstrate it. Microscopically, it is difficult to prove it; the microscopical studies, which are the only reliable ones, are in this case unavailable.

I confess that I was not satisfied with this theory. The following question came up for consideration: A few hours after the application of a constant force to a tooth a displacement is produced; how has this displacement taken place? (I do not take into consideration just now the question of pain.) It is certainly the case that the cells have not had any time to act, hence there is another factor involved; and this is the one which I will describe and which is the key of the process.

This factor consists in the compression of the large bony cells of the diploë of the maxilla. An observation which supports this theory is that after the conclusion of a regulating operation the thickness of the alveolar wall covering the root of the displaced tooth is the same as before the operation. If we admit that the

osteoclastic cells have destroyed a portion of this wall it should be thinner, or should have even disappeared along a certain portion. But this has not been so in my experience, nor in our professional literature is any mention made of such a resorption,—and I have read everything that has been written on this question from Fauchard, in 1728, to Dolamore, the performer of the alveolotomy described in the *Progrès Dentaire* for June, 1900.

How can we explain such a fact? Very easily, if we accept the explanation based on the compression of the osseous cells, which, on account of their elasticity, return to their primitive form by pushing backward a quantity of the tissue of the alveolar wall corresponding to the quantity compressed; and again, this wall would push the neighboring portion. This same phenomenon takes place in the entire osseous substance, also in the osseous portion behind the root.

This hypothesis seemed to me to be more rational than the previous one, also more in accordance with the results observed; but we had to support this hypothesis with facts. The experiment that I performed was the following one: During two months two guinea-pigs had their food mixed with madder-root (a red coloring-matter). After this time the use of the colored pigment was abandoned, and a wedge was placed between the central incisors in order to separate them. Simultaneously with the separation of the incisors I proceeded to move the second molars, while the third molars were left untouched. The guinea-pigs were killed a month after this procedure, and sections of the maxilla at the level of the roots were made. The following facts were observed: The coloration was uniform in the three guinea-pigs, and no trace of the slightest osseous deposit could be seen. A deposit certainly ought to have taken place if the theory prevailing to-day was accordant with the facts. As the administration of the coloring-matter ceased the day the operation was begun, all new formation should have been colorless. I want to emphasize the fact that the cells had a deformed appearance; the anterior ones had opaque nuclei; the posterior ones had nuclei which were larger, more dilated, and of a clearer appearance. I mounted these preparations, but, unfortunately, they were broken on the train that brought them to Paris. I hope to be able to make new ones, which I shall submit to the consideration of the micrographic expert, Dr. Choquet.

In bone-development two different processes may occur: either the bone is formed from cartilage, in which case the bony cells replace the chondroplasts (bone-formation by substitution), or the bone is formed from no pre-existent cartilage (osteogenetic bone-formation). It is in this way that all the bones of the head are formed, including the inferior maxilla, although the researches of Brock, Masquelin, Julin, and Van Beneden tend to demonstrate that the osseous condyle is preceded by a cartilaginous one from the internal portion of Meckel's cartilage.

The inferior maxilla develops from the center to the periphery, as has been demonstrated by Tomes's researches. Hence we have to

deal with a bone developed *ab integra*, at least in its central portion, the only one which interests us in connection with the present remarks, and that on account of the presence of roots within its substance. The external portion is covered with periosteum, which will permit of its developing or generating in a continuous manner. But is there a periosteum on the inner wall of the alveoli? Does the periradicular membrane contain odontoblasts? No; we are in the presence of a transformation of the osseous periosteum similar to that which the epidermis undergoes at the level of the prepuce or of the lips when it is there converted into mucous membrane. Its functions are double. At first it contains cementoblasts, which can persist in their functions in an abnormal way, as demonstrated by the hypercementosis of certain diseased roots, but the deposit takes place only upon the root and never upon the alveolar wall. If we carry on the comparison to its conclusion, and try to find out the action of the osteoblasts, we might imagine that they take a part in producing necrosis in diseased teeth; but in case changes have taken place in the bone you will have to deal with compression of the osseous cells by the development of a cystic or purulent sac, or else the troubles have been more serious, in which case they will cause a complete mortification, with elimination of the sequestrum. Later on it becomes a ligament which unites the tooth to the alveolus, and maintains the tooth by means of its intercrossed fibers.

Hence, as the pericementum does not contain any osteoblastic cells, it is impossible that it should rebuild bony tissue, a condition which is necessary after a tooth has been moved. There is an objection which presents itself naturally: Why do teeth become loosened at a certain age? We are hence under the necessity of supposing that the pericementum contains osteoclasts, as their functions are apparent. I do not pretend that the true periosteum does not contain any, but only that the pericementum does not contain any. Besides, the answer is easy, as it is a physiological phenomenon: it is osseous senility. In fact, in old people the development has ceased while the dilatation of the cellular spaces yet continues. These bones will tend to disappear, or at least to diminish, through insufficiency of nutrition. These bones die from inanition. This stage is absolutely natural and physiological, and is observed in edentulous old people, where the form of the maxilla approaches that of the newborn.

And now, if we want to examine the question more in detail; let us see what the osteoclasts could do were they present. Would it be a phenomenon similar to the one witnessed in connection with the shedding of the teeth? We can answer in an absolute way, No, for we are in the presence of a bony tissue, and not of cementum and dentin; and yet we can ask, Why is not the annoying body absorbed? And even if the analogy of the two processes should be admitted, we cannot find a clear theory that could prove the point, for we are then in the presence of three theories: (1) The mechanical theory favored by Bell, which, the explanation being incomplete, does not explain the osseous pro-

lification which takes place in the posterior space. (2) The organic theory advanced by Hunter and supported by Tomes. In this theory the resorption is supposed to be produced by the large cells, which have a resemblance to the myeloplaxic cells of Robin (osteoclasts of bone-marrow) or the giant myeloid cells of Kölliker. But this theory does not explain why these cells appear at the moment when the pressure is exercised, and why they attack exclusively bony tissue, nor, moreover, why they disappear as soon as the pressure ceases; we all know from observation that they have a great tendency to reappear in the case of epulis. And, if these cells destroy tissue, how is it that the alveolar walls preserve their thickness? (3) Lastly, we have the theory of the rarefying and condensing osteitis of Dr. Redier, of Lille. This is the theory commonly entertained. But if it is true for bone covered with a normal periosteum, how can we apply it to pericementum, a periosteum modified both in its morphological elements and in its ultimate functions?

If, on the contrary, the compression and dilatation of the cells is accepted, the conclusion can be reached that the regulation of a tooth is accomplished with greater rapidity the younger the individual to be treated. In fact, age has the inconvenience of rendering the bone denser and more resistant. We could not undertake with safety a regulating operation in a person thirty years of age. Practice and observation of facts corroborates the theory that I advance.

Under such conditions, what should be the action of the appliance? It is certain that if we have to operate on a single tooth it will be against this tooth that the force must be applied; but if we have to operate upon several teeth we will have to direct the force against the bone, and I understand by bone in this case the alveolar apophysis,—that portion of the maxilla which covers the roots of the teeth from apex to neck. A fact supports this idea, and this is that if the expanding appliance of Francis Jean, which directs the force against the molars and bicuspid, is used it will be observed that the incisors which are not touched begin to separate. This separation will be impossible to explain by means of the theory of rarefying and condensing osteitis.

Now that these confirmatory considerations are advanced, we will proceed to examine the appliances at our disposal. We will find the rubber or silver cap, but this appliance acts especially against the incisors and canines. We also have the Coffin spring and the Talbot spring-plate, which have the special purpose of dilating the jaw in the region of the molars. We also have the jack-screw, but its application is difficult, especially on the molars. Besides, with all these appliances, although they render good service, two faults must be found: The first is of technical character,—the force is directed against the teeth in order to separate the bone. The second is of a physical nature,—it annoys the tongue and interferes with speech and mastication. But if, instead of acting on the interior by pressure, the force is directed from the exterior the conditions will be totally different, as the tongue will

not be interfered with; the point of support will be upon the jaw itself, and then it will be easy to modify the height of the articulation.

What shall be the form of the appliance in order that it should answer all these purposes? It should be such that the supporting point shall be on the interior of the arch, so that the force shall be applied from the outside of the mouth; and in order to unite the force to the point of support the molars should be covered with a silver swaged cap. The force is produced by a steel bar attached to sliding pieces soldered to both caps. This permits of changing the force of the bar. I have used the so-called American alarm-clock springs. These are the strongest and least bulky ones; they are 5 to 9 mm. in length by $\frac{6}{10}$ mm. in width. I have also used those fine steel bars that are used in the making of umbrella frames; these are of 1 or $1\frac{1}{2}$ mm. in diameter.

I have kept you listening for a long time to a slightly abstruse subject, and I thank you for your kind attention. My special purpose was to add to our list of appliances a new one, and to show what can be accomplished through observation; also to point out the advisability of not always accepting an already adopted theory, but to make research individually as to the underlying cause of phenomena observed.

HOW THE QUACK AND ANTI-QUACK VIEW EACH OTHER.

BY J. C. WALTON, D.D.S., HOWELL, MICH.

IN the early history of modern dentistry patronage was invited largely by the manufacturers' methods. The dentist was a tradesman. But the development of the art and dentistry's progress toward professionalism tend to soften commercial manners, to lessen occasions for strenuous competitive demonstrations, to develop sentiments of fraternal regard and common brotherhood. These results have been shown in our efforts to join together for mutual enjoyment and improvement. To assist further in this evangelizing effort, and to define an ambition and encourage a lofty hope, our fraternal associations have accepted and adopted a creed. Man has ever thus loved to set up a standard for the guidance of himself and direction of his neighbor's action.

The primary hope in organization was to array those of ethical faith and professional preferences against those of heterodox faith and commercial methods. Many looked upon these early organizations as making a "gentleman's agreement" that cut rates were to be tabooed and commercial soliciting silenced. The instinct of self-preservation promoted the organization or banding together as in the trades unions. Time has in a measure modified the hopes and aims of dental associations, but still when the temple of our annual gathering is invaded by the unethical money-changers the code is the scourge which, wielded by the orthodox enthusiast, drives lucre-loving dentists devilward. We have not always been wise in our action toward the ethical criminal. The non-administration of ethical justice in advanced circles has not always escaped observation.

The vast majority of those on the threshold of active professional life wish to place themselves in alignment with the professional and ethical currents that are bearing dentistry upward. There is a responsiveness to ethical training and argument in the average young person's soul, but only when by experience he has been taught the craft and push required by his environment to put him on even terms with his competitors as a breadwinner may he be safely classed in practical ethics. Providing for daily necessities by one's own personal effort by the use of one's energy, as manifest in talent, ambition, education, is encouraged by all. A money-making ability is the standard by which the majority of Americans value occupation and the usefulness of individuals. The exercise of those altruistic functions contemplated by the code is sure to win the approval of the leaders in dentistry, but will it pay best in dollars? This is the question revolved in the mind of those about to go out into the world to win their portion of pleasure and profit. Professional ethics and commercial ethics are incompatible, yet dentistry is an occupation where professionalism and commercialism overlap.

Circumstances have much to do in determining the ethical status of any dentist. The faculties, instinct, mode of life, education, habits, all combine to determine any one's professional affinities. Code or no code, the average dentist must adjust his methods of soliciting to attract the attention of the class he is best fitted to serve. If his actions are labeled heterodox by his orthodox competitors, "quack" is the disgraceful name with which stigma seeks to stamp his professional conduct.

What does the word mean? Dictionaries say a quack is an ignorant and fraudulent pretender to medicine; an impostor; a cheat. As applied to the practice of dentistry the definition is not satisfactory, yet those who have tried to define it have found no easy task, for the mob of contraband actions which suggest the word has never been corraled and catalogued. "Quack," says Kingsley, "has become synonymous with empiric, charlatan, and mountebank." It is not synonymous with deception, because those who were never accused of quackery deceive. It bears no relationship to immorality, because, measured by the Christian standard, one may be grossly immoral and not be called a quack, while he of perfect morals may be, easily. One may be a notorious ignoramus and not be called a quack, and the most skillful dentist may easily win the distinction.

Quackery is not simply disobeying the restrictions of the code of ethics, for one may practice in the spirit and letter of that creed and win the disapproval of anti-quacks; while it has not been uncommon for anti-quacks to evade and violate the spirit and letter even, and escape censure. It is not made up of new and unauthorized actions, for many such are welcomed in the most impulsive way by code-worshippers. It is not the use of dubious idioms and figures of speech. It is not small fees, for a quack may demand and receive outrageous fees.

The quack's relationship to the society seems to be the same as

that of "scab" to the trades union. Where membership becomes a definite guarantee of integrity and ability, quack means inferiority to anti-quack. As a rule he shuns the association, which is taken by many to be an ethical guarantee company, where candidates must pass a professional examination showing them to be free from disqualifying ethical ailments. The confirmed quack is a vagrant denied professional citizenship. At a dental meeting he betrays that lonesome feeling known only to an ostracized man. He is professionally what a crook is morally and a crank is intellectually. Quackery is composed of doings and sayings not found on the fashion-plate issued by medicine. It is not polite professionalism. It does not bear the stamp of professional respectability recognized in high dental circles.

Quackery is heresy. It is unlicensed liberty. It is doing what "thou shalt not." It is not conventional correctness of deportment. In it anti-quacks see selfishness and evil-mindedness incompatible with good professional style. Truth to the best elements of human character always goes with good manners, while quackery makes a heedless scramble in reaching after the main chance. Some make it cover all grades of unscrupulous personal maneuvering for advantage in professional profits. Others say there is no avoidance of egotism in it; that there is a lack of sincerity, with undisguised coarseness. In professional morals the quack is a child and needs correction; needs disciplining until he will submit to restraint. He is supposed to be saturated with chicanery and duplicity. He guesses the professional game wrong. He is cheap and noisy. He is not polite to the profession singly or collectively, and we feel insulted. Professionally, he is an impossible. He is sometimes weak and shifty, and sometimes brutal and bull-headed. He caters to that unthinking part of the public which is carried away by apt catch-words, and never stops to examine their accuracy. He is defiant.

The idea underlying the use of the word quackery seems to imply a disapproval of something low and vulgar which is detected, and deserving of condemnation. In what, then, does this vulgarity consist?

In all times and among all people the aristocratic and influential classes have been those who are raised above the necessity of labor. Whether these classes are represented by a plutocracy, as in the United States, or by an hereditary aristocracy, as in Europe, the result is the same; they wish to shun the thought of that humble foundation upon which rests the fabric of their greatness and try to shut it from view. Among professional men trade and commerce seem especially to typify that humble origin of power, and instinctively we try to plan so that naught which savors of trade shall come betwixt our professional popularity and our nobility.

The enormous development of industrial enterprises these later years, which have given us our banker barons, merchant princes, and manufacturing magnates, and given to their transactions almost the dignity of affairs of state, has perhaps modified our scorn of

this base of social aristocracy. It is not to be denied that as a rule any action or expression that betrays a trade or commercial interest in private practice is tabooed. Therefore, the effort to give one's-self favorable publicity through the agency of the newspapers is a quickly recognized betrayal of commercial interest. It savors of trade as a means of offense and defense in the warfare of professional competition, and is forbidden as the use of Greek fire is forbidden by the law of nations. Professionally, the quack is defective and degenerate. He tries in an unsanctioned way to appropriate his ethical brother's *clientèle*. In the battle for business he uses weapons pronounced barbarous by the law of professionalism. His ethical brutality demands his fraternal degradation in the ranks of dentistry. He is called quack with a breath malodorous in malediction. Some in their ethical hate would smear the odium on the skirts of his family.

The Anti-quack is the negative of Quack. His ethico-economic Messiah is the code. His chief attribute is intolerance for any dentist accused of commercial witchcraft. His cordiality is markedly reserved for one not vouched for. He is distinguished by his self-approbation, professional bias, and professional vanity. He is an emotionalist about ethics, and wins the smiles of all good quacks by his exaggerated eulogies of "our profession." He is full of that delicious egotism that declares, "Dentistry is It." Good quacks see an inconsistency in the fact that one may be given to racing, dicing, drinking, swindling, fornicating, and hypocrisy and be more ethical than he who ranks well by Christian standards yet creates favorable publicity with printers' ink. Good quacks are amused when dethroned "ethical" advocates—ex-presidents of dental associations in prosperous days, etc.—get discouraged into sterility and commerce by the ethical disrespect and indifference of younger generations; they smile when idealism vanishes under pressure of practical obstacles, and their measure of aversion to joyless commercialism changes to the measure of active trading genius.

For the anti-quack, right or wrong is what is permitted or forbidden by medico-phobiacs. He pines for that in his profession which in social matters is symbolized by a dress suit, for that to which he hopes a dress suit will entitle him. He cannot dissociate himself from his Ego. He cannot look at himself calmly from another's standpoint. He counts on cultivating his practice through social and altruistic functions, and the expenditure of his income in cultivating social friends. He trusts to the advantages of character and station in society. He aims to be genteel in a professional way. He expects the association and its creed to do for professional etiquette and morals what a police force and law is expected to do for brutality and crime. He is a believer in social cast. He is exclusive in his tastes. He looks upon his professional ideals as of necessity penetrating the souls of other men. He worships the code because, everything considered, he expects greater pleasure and profit from following its lead than a different course.

Once the use of amalgam and rubber found no furtherance in him, and acceptance only when he had exhausted every resource of

opposition, but professional etiquette finds a most august expression, the cause of education an inspiration of its loftiest ideals, and medicine a friend from whose fidelity it never can expect too much.

The typical dentist is not a quack, neither is he an anti-quack. He is the ensemble of the distinctive characteristics of the profession. Public opinion is dominant and supreme. Professional status is determined by the average ability and character of dentists as a body, and the dental intelligence of and ability to appreciate the benefits of dentistry by the people. What the public pronounces a dentist stands. The consensus of public opinion is of more value than the resolutions of any minor number in convention assembled. The ambition of a handful of men cannot create public sentiment by fiat.

The average dentist believes it is important to have the true capacity for citizenship; to become well qualified to perform the tasks allotted to his chosen field of activity; that in the department of professional morals a good or a poor dentist is not made by splitting hairs over printers' ink, nor by daily rehearsing the code of ethics, but by obedience to a well-instructed conscience; the exercise of a firm character that daily strives to do the right and avoid the wrong.

He believes it is unwise to overlook in human nature that trait which hopes for gain, and that the percentage who wish to realize a competence in dentistry is as large as in any other vocation. He does not believe that dentistry is either religious, sentimental, or philanthropic in its tendencies, but that there is a better professional outlook and that we have clearer views of right action and correct practice than a decade ago. He believes our ability to agree and unite on matters of general interest depends upon fraternal confidence,—the extent to which we trust one another. He sees a lack of mutual and general confidence among dentists, and deplores the fact. He believes that relief is slowly developing from outgrown traditions, and that no measure of professional character is more just than the golden rule. He scouts the notion that we are losing our interest in true ethical advancement, but he has as little use for the code as the average Presbyterian has for the Calvinistic creed, and he welcomes the current of intelligent liberality now setting in. He desires success in the sense in which it is understood by the world. He believes we have little to fear from badly bad or goody good dentists, for they are in the minority, and that in the long run the evils of quackery and anti-quackery tend to disappear. He believes that those who have been pouring out their wrath on the quack have failed to admit the real point of offense. He knows that in the face of a great abuse public sentiment always arouses itself; therefore if the public patronizes the advertising dentist it realizes some benefit. The same judgment and honest purpose of the average citizen is a tremendous weight in the scale on the side of business honor and fairness. The actions of the public prove that there is some utilitarian value in advertising dentists. He sees that "man" loves more or less to test his powers with others; self-preservation prompts profitable action, and professional chivalry disapproves of

popular action, seeming haste to acquire, and orders us to fall in line and take our chances with the crowd. He sees that soulless corporations called colleges are booming their attractions, and are largely responsible for the crowd, while they offer no improved machinery for cultivating the soil they expect their outpouring workers to occupy; and sometimes he grows impatient with his environment and the restraint prepared by others. He sees college managers and other recognized teachers and patterns of professional righteousness expounding ethical law with all manner of casuistic subtleties, settling and distinguishing all its possible external circumstances and applications, and at the same time devising subtle quirks for evading an inconvenient command. He sees the enforcement of the code very rarely attempted, except as a matter of retaliation and discipline when some society member is hurt by another's financial policy. He recognizes the association as the conservator of professional morals, and is rather pleased to know that such an institution exists; but he does not realize that his ethics need revision, nor does he see how the dues, loss of time, car fare, hotel bills, restraints of membership, and censorship to be endured are met by compensating advantages.

Congeniality of occupation and money-making capacity are his standards of value, and his basis of regard for his vocation. Few know how to use printers' ink to advantage, or care to experiment with it; and the majority think little and care less about the ethical features of it unless someone disturbs their income by its use, when one will occasionally join his local or state society hoping to find a convenient cover from which to strike back at his tormentor. To him the adoption of commercial methods is not an evidence of depravity. The good will of the public is of more value than the approval of the profession. He does not wish any instructions in business manners and morals. He gets his practical education in these things from the community or circle in which he lives. His conception of ethics is being made over out of the ethical conscience of our time. He believes the quack and the anti-quack have each overstated their case enough to weaken their cause, and that overstatement and perpetual harping on the subject has not made us more truly ethical. He does not try to increase his professional elevation by calling himself stomatologist or odontologist. The public calls him dentist, often forgetting the courteous "doctor," and majorities rule in this country.

Reform is seldom promoted by the misstatement of extremists, and rational people, whether dentists or their patients, are more strongly influenced in the long run by careful adherence to the facts. A great obstacle to ethical reform is exaggeration of the offense, and the retaliatory incentive apparent in its defense, which so often makes a great part of the means used to promote such a reform.

There is a large and growing number of typical dentists that are fair-minded while not being opinionless, and whom to know is to discover congenial whole-souled gentlemen quite as attractive as the all-partisan stripe. It is to be regretted our associations cannot be made more attractive to them.

The writer confesses he has never experienced the intensity of competition said to exist in urban centers. This may be the reason why he has never shared in the belligerent antipathy manifest between the ethical extremes in dentistry. From a sociological standpoint, he has interested himself and tried to discover why. The reader may think he has failed.

The title indicates his authority for the reasons he discloses. The bitterness expressed by many in reply to his inquiry forbids quotation of language.

THE TRAINING OF THE SENSES OF SIGHT AND TOUCH ACCORDING TO MODERN EDUCATIONAL THEORY.

BY MR. CHAS. F. WARNER, SPRINGFIELD, MASS.

(Read at the annual convention of the Northeastern Dental Association, Providence, R. I., October 16, 1900.)

It will be impossible in a paper of reasonable length to take even a brief survey of those portions of the philosophy of education which might have a bearing upon this subject. All that one can hope to do is to direct attention very briefly to a few of the more important phases of educational theory which may claim a more or less intimate connection with the training of the senses of sight and touch,—two senses which are generally considered to be more active than all the others in the practice of any manual art.

In order to understand the educational principles upon which the training of any special functions depend, it is necessary, first, to understand the nature of those functions. If, therefore, we are to study the principles which should govern the training of the senses of sight and touch, we ought to take into consideration, first, what modern psychology has to say about the nature of those senses. It would be well if time would permit us to make a thorough investigation of this point, and call to our assistance all the important facts that have been accumulated by the study of mind and sensation. It would be better still if the results of such study could be accepted as final, if we could be absolutely sure that the information thus obtained would be the definite conclusions of positive science. But such definite knowledge of the true nature of sensation is not accessible to us. Man's nature is too complex to admit of an examination so precise that all the results may be expressed in the terms of exact science. There are, however, some considerations upon the nature of the special senses, the philosophy of their operation, and their relations to mental activities which are so evident that they may be called matters of common sense, and so fundamental that they cannot be overlooked in a discussion of principles which should guide us in the education and training of the special senses.

Every one is familiar with the fact that we gain all our knowledge of the external world through the senses. Man enters life a stranger, absolutely ignorant of his surroundings; but he is endowed with certain undeveloped senses, by means of which ex-

ternal objects at once begin to make impressions upon his mind or soul. Nature, whether animate or inanimate, is at first his complete master, and he is attacked on every side by excitations furnished by the countless things around him. At first he doesn't see those things; he knows nothing about them. He only receives the stimuli which they furnish through the nervous system. But the inner self of this new creature answers these stimuli at first with primary sensations only; soon with ideas also. When first he opens his eyes he has no sight. He can neither see nor locate things. But he does not long remain blind. The power of perception is quickly created in his soul. He can soon see, hear, taste, smell, feel, and at last he conquers the world by perceiving it.

It is important for our purposes to understand how the modern theory of mental development differs from that which is fast passing away. The metaphysics of the first half of this century was based upon the theories of John Locke, who described the mind or soul as a tablet on which experience writes its messages. Locke's essay concerning the Human Understanding had a powerful influence over scientific thought,—an influence which has extended almost down to our own time. But this conception of the human mind or soul as passively receiving and recording impressions like a mirror or a tablet, the conception of ideas as mere images of things, has been abandoned. On the contrary, the mind in perceptions is now believed to be thoroughly active, transforming a physiological change into a psychical result,—*i.e.*, every nerve activity which is concerned in perception is a stimulus to which the mind responds with a distinctly different result,—a result which is peculiar to itself. What a given object effects in our mind through a given sensation may be understood by reflecting upon the sensation itself; and if we consider what that sensation really is, we shall see that it gives us little or no knowledge of the nature of the object. The sensations tell us rather how the object appears to us. It is sometimes hard for us to recognize the fact that we do not discover the true nature of things by our perceptions.

Strictly speaking, what we call the properties and activities of things are only our sensations,—*i.e.*, psychical conditions arising from stimuli which proceed from the effect of external objects upon the nerves. Thus, when we speak of the sound of a bell, we commonly but erroneously consider that the sound belongs to the bell or proceeds from it, while, as a matter of fact, the sensation we are thinking of is wholly a psychical condition. It is in our own minds and belongs to us, not the bell. If you can imagine this bell to be rung by some automatic device in some remote place where no life exists, it is easy to see that it will produce no sound, if by sound we mean the sensations which we usually describe as the ringing of a bell. Of course there will be the vibrations of the air, but that we seldom think of in describing a sound. Suppose, now, there were no other means of our acquiring knowledge of this bell except by this one sensation, which we may now describe as a psychical condition created by the soul itself under the stimulus of a nerve change which was occasioned by pulsations proceeding from the

bell and falling upon the drum of the ear. How much of our present idea of the bell would this one sensation give us? Evidently very little of it. Following out the same line of thought in connection with the other sensations produced by the bell, it is easy to see that our idea of it is not a single mental image which the perceptions have engraved upon the mind, but it is itself a creation of the active mind in all the various activities which have been stimulated by the several sensations occasioned by the contact which that bell has made with sense nerves through other forms of matter. The mind by its activity through one sense can create a very limited idea of the nature of things. By means of two senses it can do more, and by the best exercise of all the senses it can simply do its best; but, as one psychologist puts it, "no created spirit ever penetrates to the heart of nature."

This theory of ideas as the product of the active mind explains why it is that no two persons have exactly the same ideas as a result of the observation of a given object. This wide variation in ideas of the same object is not so apparent in common things as it is in those which are unusual. When you ask a friend whether he noticed this or that about a certain common object, he may at first tell you that he doesn't know whether he did or not, but after reflection he is certain he did. Such examples are of little scientific value as material from which to study the nature of perceptions. We get much more light upon the subject by the examination of the effects upon different people of some unusual occurrence.

Last spring I witnessed the total eclipse of the sun as one of a party of about seventy-five. Some of the party were expert astronomers; others were educated people of no great expert knowledge; some were young people having very little knowledge of astronomy, but all belonged to the intelligent and thoughtful class. We witnessed the eclipse from the roof-garden of an hotel in Norfolk, from which point we could also gain some idea of the effect of this event upon the crowds in the streets below. This was the first time that I had ever witnessed this sublime spectacle, and you may be sure that I did not fail to appreciate the spectacle itself when I say that one of the most surprising and interesting observations which came to me was the great lack of agreement among the various observers and the great variety of impressions which the magnificent sight made upon them. I do not like to say that every one saw what he expected to see. I must confess, however, that I saw, for the most part, what I looked for, although the sight exceeded my expectations. I looked for the shadow bands, and I saw them. I examined the corona, whose brilliancy and substantial appearance were to me the great surprise of the day. The form of the filaments was impressed upon me. I caught sight of the aigrettes, and was about to make a more careful study of the coronal streamers when I thought of the flames, and, behold! there were two beautiful pink flames which I saw as soon as I looked for them. I caught a clear sight of Mercury and the red flames; was indescribably impressed by the sight of the intensely black moon as it passed between the earth and the sun, and through it all I felt

the chill of the atmosphere. I recall the keen effort of all my senses, which seemed to put them in conscious readiness to seize upon any object of perception that might present itself unexpectedly. I even listened—for what sound I do not know; but, being somewhat of an audile, I could not help the effort.

It was all over in ninety seconds, and then I sat down to make a drawing of what I had seen. When comparing my notes with those of others, I then discovered the great variety of observations made by others that had entirely escaped me. There was some agreement, but there were greater differences. All had been greatly impressed, but not by the same observations. Only a few saw the pink flames which I saw, and which were seen by observers in Georgia and Tripoli, so that I know they were there; but I failed to be impressed by the outer corona, which some traced nearly up to the planet Mercury, which was clearly visible. One observer was particularly impressed by the blackness of the columns of smoke from the chimneys of the city as the moon's shadow fell upon them, making them appear like solid banks of coal; but I saw nothing of that. Another spoke of the rich coloring of the sky as it varied from a dull orange at the horizon through the innumerable shadings of a glorious sunset into the indescribable blackness of the dark side of the moon; but all this glory entirely escaped me. I did not see the Bailey's beads which were observed by a few, and among them a little girl about twelve years old, in whose observations I put perfect confidence. She had to see something remarkable, since she might be expected to sustain the reputation of two families illustrious in science whose name she bore.

There was a marked difference in the effect of this phenomenon upon the party of intelligent observers on the hotel-roof as compared with its effect upon the crowds in the street. The latter, among whom were a considerable number of blacks, set up a sort of shout, in which there were notes of fear mingled with those of surprise. In this they persisted through the entire time of totality, ceasing as soon as it was over. But among us there was the hush of awe and the silence of busy observation. This did not give place to any audible expressions until the event was over, and then applause, the most genuine I ever witnessed, burst forth, and with it the sincerest expressions of satisfaction and congratulation. Judge Holmes, who was a member of the party, when asked his impressions, remarked that it was to be counted as one of the four great sights of his life. The other three were a storm at sea, a great battle (Gettysburg), and the Swiss Alps.

I have by no means exhausted the varieties of sensations and observations which came to my notice on this occasion, but I have mentioned enough to give point to an inquiry into the reasons for such a variety of impressions proceeding from the same object. Whence arises this variation in the perceptions of the same natural phenomenon? It is clear that the answer to this question lies in the nature of the process of perception. The truth of the matter is, we do not perceive anything by a simple act of the mind in becoming conscious of mere excitations. The babe probably begins in

this way, but so soon as there is the dawn of an idea the foundation is laid for real perception. The sense powers, like other mental acts, build upon beginnings almost infinitesimally small. They gain in strength by exercise. The sense organs, with their special nerve connections, are all furnished ready-made, though undeveloped, for the purpose of giving the stimuli which are to furnish to the soul the evidences of the existence and nature of the external world. But the soul's resistance to these stimuli—*i.e.*, the sensations—are at first very feeble. The newborn infant may be supposed to stop with the mere sensation, because he is incapable of adding anything to it. Only in the most elementary sense can he be said to have any perceptions. He certainly doesn't know enough yet to see an eclipse of the sun, but he has a soul feebly active; he maintains a continual, though feeble, resistance against the stimuli that come through the sense organs and nerves, and somehow records these efforts or sensations. Soon he has recollections, comparisons, ideas, which he can bring to bear upon all new stimuli; then, and not till then, he begins to see, feel, hear, taste, and smell in a real sense.

It is in the recognition of this second act of perception—called *apperception*—that the new philosophy differs from the old. All our sensations, according to the modern theory, are largely the direct result of the activity of the mind in this secondary perception, assimilation, *apperception*. Simple, primary perceptions play an essential but relatively small part in this process. So soon as they arise in consciousness as the result of some stimuli from the special sense nerves, they are immediately joined to similar feelings or related ideas already in the mind. Thus held in consciousness for a time, they become clearer, more definitely connected with other related mental activities, and so assimilated or *apperceived*. This second psychical process assumes an importance in all our sensations far beyond the primary perceptions, and it is this fact which is of the greatest significance in suggesting true methods of acquiring knowledge through the senses. It leads to the inevitable conclusion that the character of our sensations and the kind of knowledge we acquire through them depends of necessity upon the character of the sensations previously *apperceived* and the knowledge already acquired.

Referring again to the example of the solar eclipse, there were, of course, certain elementary perceptions, due to the original constitution of the minds and sense organs of the observers. To conceive these to be all the sensations possible would be to imagine intelligent people endowed with minds as undeveloped as that of an infant. In viewing this phenomenon the observers brought to the aid of the simple and fundamental processes of sense perception a varied store of ideas gained through observation of other related phenomena, through instruction, through reading, and through reflection. Under the influence of a keen expectation the will was brought into service in banishing irrelevant suggestions; in bringing into easy command all ideas that might assist the mind in *apperceiving* the new sensations; into putting the sense organs into

readiness for action, and in directing the attention upon the object to be viewed, or, more properly, upon the stimuli it occasioned. Thus was the sublime spectacle brought into the enlightened consciousness, made more vivid and definite by a keen, intelligent interest, and employed to enrich the minds of the observers with new ideas in proportion as they were able to assimilate the various sensations that offered themselves.

This theory of sensation helps us to understand why solar eclipses and other unusual phenomena have had such curiously different effects upon different peoples. Those of a scientific spirit apperceive an eclipse calmly as a rare but natural event. To the ignorant and superstitious it generally arouses the emotion of fear. This was the common effect among savage tribes. Among the semi-civilized people of antiquity, whose gods were the heroes of mythology, and who often saw the hand of the supernatural rulers of the world in natural phenomena, it assumed a distinctly religious significance. History records how once the Medes and Lydians stood facing each other in battle array waiting for the word to begin the conflict, when the sun's light gradually faded from the sky, and for a few minutes the astonished armies gazed upon the glories of a total eclipse. Seeing the sun-god thus hiding his face behind his shield, the event was apperceived by both the contending armies as an unmistakable mark of his displeasure; whereupon they immediately threw down their arms and concluded a peace.

I have enlarged upon this illustration of the varied character of the perceptions awakened by a solar eclipse because it furnishes such a striking example of the important part which the apperceiving of ideas plays in the perceptions of an unusual object. It would be difficult to trace with accuracy the character of the mental processes which go on in those more common and more limited perceptions which it is the object of this paper to discuss, but it will not be doubted, I think, that the underlying principle is the same in all cases of sense activity; indeed, there is no lack of authority to sustain this view. All modern writers on this subject emphasize the idea of continuity in the capacity of sensation. This capacity does not spring afresh each time in the human being out of material incapable of sensation, but it is an acquired wealth of psychic power which has been created out of the proper use of an inherited endowment, without which there could be no sensation and no knowledge.

Every crude fact of nature that excites this power of sensation is transformed by it into a new fact whose character depends upon the immediate psychical use which the mind perceiving the fact is able to make of it. This is not saying that the mind creates the facts,—that the world exists only in the living soul. Modern philosophy does not doubt the existence of the great universe of facts apart from and independent from the mind, but when, through sensation, the mind comes up against these crude facts it can grasp them only as it can modify them to meet its own power of assimilation.

To cultivate the observation, then, is not so much to train the

sense organs to extraordinary sensitiveness as to furnish the mind with a well-organized body of ideas, ready to be utilized in the acts of apperception with every fresh stimulus which the mind receives from the external world. For the use of general observation this store of knowledge should be wide and varied. On the other hand, training for minute observation in special directions—which is almost equivalent to developing special forms of perception—must consist largely in furnishing the mind with a store of detailed knowledge of a kind to correspond with the impressions which the senses to be trained are qualified to give. Whether the observation be general or special, it is knowledge that makes it possible, directs it, and gives it force and meaning. Here, as elsewhere, *knowledge is power*.

But knowledge is too broad a term to use in this connection without some qualifications. In thus speaking of it as the basis of the exercise of the senses of sight and touch, it clearly must have a special meaning. What are the characteristics of a knowledge that thus connects itself with the exercise of these senses, or, to use the more technical terms of psychology, what kinds of apperceptive ideas among the mind's furnishings are especially concerned in seeing and feeling? We ought also to inquire how these necessary ideas may best be acquired. If these two questions could be answered, we should have in their answer the solution of the problem of training the special senses. It is possible to give only a partial answer to these questions and to make some suggestions consistent with principles already explained.

Some psychologists have classified mankind according to the kind of impressions to which their minds are most susceptible. While all ideas of the external world are derived through the exercise of the senses,—sight, touch, hearing, etc.,—men differ in the character and in the intensity of the mental impression which is made through these several avenues. So important does this difference sometimes become, according to this view, that the ideas of one class of men are believed to be largely based upon impressions derived through the sense of sight. Such men are called *visiles*. For a similar reason other men whose ideas are based upon the sense of feeling are called *tactiles*, and others who depend largely upon the hearing are called *audiles*. It is always admitted, of course, that all these methods of acquiring ideas are employed to a greater or less extent, and sometimes perhaps no special emphasis is placed upon any one of the three important ones mentioned. And yet it is believed to be generally true that some one of these is overemphasized, either on account of natural susceptibility or accidental training.

But this division of minds into definite classes according to the apparent relative importance of one special sense over the others in furnishing ideas, although it may contain an element of truth, ought not to be taken too seriously. Like other classifications of mental phenomena, it is likely to be misleading. Not only are the minds of those who may be called *visiles* furnished with ideas derived through the exercise of all the other special senses, but even

those ideas which may seem to be distinctly visual are, upon closer analysis, found to be made up of elements derived from audile, tactile, and, we must also say, motor elements. The fundamental fact is thus stated by Baldwin, "Every mental state is a complex of sensory and motor elements, and any influence which strengthens the one tends to strengthen the other also." It would follow from this that special powers of observation in any special direction do not wholly depend upon the one special sense directly involved, nor upon those ideas that are directly furnished through this sense.

It is related that Charles Dickens used to amuse himself and his friends by enumerating hundreds of sights and incidents which he had witnessed during some afternoon stroll, nearly every one of which had failed to be observed by his companions. This was possible not because Dickens had remarkable visual powers merely, but rather because all his senses were keenly active every moment, while his mind was stored with an extraordinary number of apperceptive ideas which were ready to seize upon and assimilate most, if not all, of the multitude of impressions which came to him, so that he could describe them with the utmost accuracy of detail. He seemed to see, hear, and feel everything that could come within the range of a score of men. Witness the character of some of his descriptions,—*e.g.*, that found in the prelude to the first chirp of the "Cricket on the Hearth"; for whether we consider the art with which he drew his word pictures, as shown in their composition, with such minuteness of detail, or contemplate the wonderful memory and imagination which created or reproduced these scenes, it comes to the same thing,—*viz.*, a phenomenal power of observation which nothing could escape.

Ordinarily we may say that there are seven senses,—the sight, the hearing, the taste, the smell, the touch, the feeling, as of warmth and cold, and the muscular sense; but we must also recognize that each of these is susceptible of such fine gradations and such a range of development by education and training that the character of the impressions gained through them may be multiplied and extended. This extension of the sense power multiplies the number of things to be seen and enlarges our grasp upon the universe. The prismatic colors which compose the white light of the sun may be said to be seven in number only upon the most elementary consideration. If we consider all the individual colors that may be distinguished by the expert eye, we shall have to recognize hundreds and perhaps thousands of colorings. Some artist has gone so far as to say that he can recognize four thousand shades of red.

This principle has its application to the senses—especially of sight and touch—when they are developed to their utmost. We must take into account the acquired powers in addition to those which are common to all normal persons. Think, for example, of the expert vision of the microscopist, who can locate a single bacillus of disease among myriads of harmless germs; of the astronomer, whose patient search is rewarded by the discovery of the little fifth satellite which he and a hundred others have been

hunting for among the stars for years; or of the watch on the quarterdeck, who can make out every necessary detail of a ship or other object at sea, although to a landsman it is totally invisible. Or consider for a moment the delicate touch of a skilled surgeon, who can recognize the character and position of the diseased part with such precision as to enable him to insert the lance at just the right point and exactly to the required depth to bring the necessary relief. Witness also the wonderful tactile power of the educated blind. Your own profession furnishes abundant illustrations which I cannot and need not describe to you.

You will recognize at once the truth of what I am saying,—namely, that all the special senses are susceptible of such a high degree of cultivation that it is no misuse of terms to speak of specially acquired powers as extensions of the senses, or, indeed, as new senses. One who has only the ordinary endowments of hearing, sight, touch, etc., without the special powers referred to must be considered as deaf, blind, or incapable of feeling, so far as concerns all those finer sensations which require for their perception extraordinary powers. By some these special powers are acquired with apparent ease; by others with great difficulty or not at all. This question of natural susceptibility is a most important one. There are some whose eyes are naturally dim, and whose ears are by nature dull of hearing, and whose sense of touch is crude, who yet by training may acquire normal perceptions; and there are those endowed with ordinary normal senses who by education and training may be brought to acquire certain extraordinary powers, or what may be called new senses. Again, there are those whose senses of hearing, touch, taste, etc., are so dull or defective that they can never be made even normally keen by training; and there are those whom no manner of training or education can endow with these extraordinary senses of sight, touch, etc., which are the peculiar requirements of certain professions. But let it not be forgotten that both normal and acquired powers of sensation do not depend wholly upon the perfection of the sense organ involved. Sense capacity is a mental capacity, and depends, far more than is commonly supposed, upon the mind's ability to acquire useful ideas and to apply its store of ideas with alertness in the act of apperceiving or assimilating new impressions. Even defective sense organs joined with strong minds are more efficient than normal organs with weaker minds back of them. Some of the keenest observers, both general and expert, are to be found among the nearsighted.

It has been my peculiar fortune for some years to observe the education of young men along practical lines. I have witnessed many a hopeless struggle against natural inaptitudes, or the results of improper early training. I have known boys whose visual and tactile impressions seemed to be of the crudest sort, who yet attempted to fit themselves for the practice of such a pursuit as mechanical drafting or tool-making. The results of this sort of misapplied energy would invariably be ludicrous were they not sad and pitiable illustrations of an all too common mistake. These young men have not been generally defective. There has invariably

been some line of activity in which they could secure a measurable degree of success. I can think of several who finally became interested in music and have found their forte here. Others have drifted into commercial life, and have made a success; but there are some who have still plodded on with a fatal persistency in the fruitless endeavor to do that which their Creator never intended them to do. Having no eyes, or very dull ones, they try to see; and having no accuracy of touch and no power of co-ordinate manipulation, they try to become expert with their hands. They are spending their lives in spoiling materials; in bringing loss and disappointment to their employers and friends, and making a sad failure of life.

I am sure you will not understand me to wish to underrate the value of education and special training, and I do not know that it is in danger of being overrated; but I am inclined to think that it is sometimes misunderstood, or at least not wisely applied. It is a mistake to suppose—if any one has supposed it—that a technical school may take a young man at the age of twenty, or even younger, and undo all the results of heredity and early training and in four years turn him out a new creature. Am I not right in supposing that there are many people who act (unconsciously, of course) upon this principle? The very existence of so many special schools favors the practice of this error. When there were no schools of art, no schools of applied science, no schools of dentistry, no technical schools of any sort, the specialists and experts came to the surface because of their own natural tendencies. There was no other way.

The boy Giotto, discovered by a Cimabue sketching on a stone one of the sheep which he was shepherding, was encouraged by the latter to come to his studio and practice. This was all that was necessary to make Giotto's name famous among the world's great painters. Perhaps you may say that it is inevitable in any age that genius shall come to the front, but I am not so sure that if Giotto had lived in our day his parents would not have sent him to a law school or to a school of electrical engineering.

History is full of examples like that of Giotto. Even in our own century, before the present development of special schools, the same thing was true. John Frazee, who is said to have been our first native-born sculptor, began as a stone-cutter; so also did Hughes and Clevenger. Augur was originally a shoemaker, and Hiram Powers began as a mechanic.

I have lately been looking over the memoir of Henry Dexter, the sculptor. In his early life he was determined to be an artist. He drifted naturally into art, and began by painting in the city of Providence. He painted everybody that could be induced to sit to him. Without money and without friends, he struggled along through his youth and early manhood working regularly at his trade, but devoting every spare moment to art. After a long and self-directed apprenticeship, at the age of thirty he set himself up in humble quarters in Boston, and, though friendless and without a reputation, he dared to begin life in earnest as a portrait painter.

Here he struggled on for some time painting a few portraits, copying more, but barely earning a living. One day a new path unexpectedly opened up before him, and leaving everything else behind and entering this new path, Henry Dexter was led on to fame and fortune. It came about in this way, as his biographer tells it: "He had happened to have some molder's clay brought into his studio, where it lay in a corner for some months, growing hard and dry. In an idle hour he gathered up some of it, softened it with water, placed it on top of a barrel, and began to mold the head of a brother artist who happened in, and to whom he playfully remarked, 'Come, White, let me put your head into this mud.' He had no knowledge of the manner of handling clay, and, having no tools, he used his fingers for forming the features. The clay became an amorphous lump; then the rude outlines of a face such as we fancy we see in clouds or mountain crag appeared; and at last the distinct lineaments and similitude of the face before him, frightening himself and astonishing his model. And this," his biographer beautifully concludes, "was the morning and evening of the first day when the sculptor was created in the soul of Henry Dexter."

But there is more poetry than fact in thus speaking of Dexter's discovery of his own talent as a sudden creation. One may see in it the triumph of genius, but if we examine the case more closely we shall see that it is not a sudden and unaccountable awakening of hidden power. It has its natural explanation, and we shall find it if we examine into the circumstances of the early years of this man's life. Dexter was endowed with an artistic nature, but long before he tried his hand at portrait painting he had learned the trade of blacksmithing. Such a pursuit may seem a strange kind of preparation for work in the fine arts; but, given the artistic temperament, I claim that the creation of the artist may be found in the cultivation of the perceptions through constructive activity,—*i.e.*, the exercise, especially of sight and touch and the sense of proportion, through manual training. In this work he was remarkable for his quickness of perception and rapidity of execution. He was regarded at the time as the most skilled blacksmith in the region. It is claimed that he could make a dozen axes in a forenoon, which was a day's work for the ordinary workman. All difficult jobs were entrusted to him, and he was never known to fail to do them satisfactorily. Speaking of these days himself, he once said that he believed he could hammer a statue out of iron.

The practical bearing of all this upon the subject under discussion, I think, cannot escape us. With all respect to the wonderful results of special training and education along technical lines, we must not lose sight of the fact that the impossible is sometimes attempted, and the impossible cannot be done; and we must also remember that if we are to undertake the creation of special powers out of crude material, we must be sure that there is native capacity, and that it is brought into exercise early in life and cultivated by proper early training.

To produce the ideal practitioner in dentistry, whose eyes and

ears and nerves of touch must be extended not merely to the finger tips, but to the tip of the probe and become a part of every tool, you must at least start out in your schools of dentistry with young men who can use their eyes and ears and hands with rather extraordinary ability. In the historical development of your art you are, of course, aware that in the early days, before the existence of schools of dentistry, your best practitioners began life as mechanics, jewelers, or goldsmiths; and when you reflect upon the fact that in those days the machinists and jewelers and goldsmiths and all the other artisans had served long apprenticeships in their various pursuits, and also that under this system native ability of a peculiar kind was more likely to be recognized than in our day, you will see that the examination of the qualifications for admission to your profession, though it may have been less tangible and definite, was, on the whole, rather more searching and effective than it is in the schools of the present.

Nothing is more likely to bring about a natural method of sifting out the material which is to find its way into the technical professions of our times and give the proper directions to native and acquired capacities than the ever-increasing attention that is now being paid to the claims of manual training and secondary technical education. In order to have effective technical education, we must have effective secondary education. Theoretically speaking, manual training is not a new idea. It has been preached as a cardinal doctrine by the leaders of educational thought for two hundred and fifty years, from the time of Comenius down to our own times; and yet the influence of the old monastic systems of the Middle Ages upon education gave such an immense momentum to the traditional school that it has been slow to recognize either the educational or the practical value of the reform which is just now beginning to gain headway. For this reason manual training may be considered to be practically new; that is, it is an old idea which in our time is receiving slow but just recognition. Says Professor James, "The most colossal improvement which recent years have seen in secondary education is the introduction of the manual training school."

So we have in our day manual training and some technical education in our secondary schools, and we are to have more as the years go on. All this, rightly utilized, will help those professional schools whose work is so largely technical in character. The growing emphasis which is being laid upon motor education in the elementary schools, if it does not make up for the loss of all the good that came out of the old apprentice system, will at least, it seems to me, enable our youth to discover their natural aptitudes or their natural inaptitudes, which is quite as important, and direct their elementary education along those lines which Mother Nature marked out for them.

REFLEX AURAL SYMPTOMS DEPENDENT UPON DENTAL CARIES.

BY EDWARD BRADFORD DENCH, M.D.,

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(Read before the New York Odontological Society, November 20, 1900.)

MR. PRESIDENT AND GENTLEMEN: It seems preposterous for me to address an audience composed almost entirely of odontologists upon the subject of dental caries. My only excuse for this paper is the teaching of experience; no one can confine himself to the study of pathological conditions found in any one organ or set of organs to the exclusion of the remainder of the body.

In the early days of medicine a doctor attended to all the afflictions of the flesh. He could pull a tooth, syringe an ear, cut off a leg, or introduce a new being into the community with equal facility. At present all this is changed. The average individual does not trust himself to the care of any one medical man, but, owing to the extensive development of specialties in medicine, attempts to find a doctor for each of his ills. He has one man for his nerves, another for his stomach, a third for his nose, and a fourth for his teeth. While this is highly commendable on the part of the public, as contributing to the support of indigent medical graduates, the results do not always redound to the advantage of the patient. Specialism in medicine is good if not carried to excess; if this feature is not avoided it becomes one of the most dangerous elements in the practice of medicine.

The human economy must be regarded as a whole, and the fact that pathological conditions in one part of the body may produce symptoms referred to some part of the body more or less remote must be constantly borne in mind. One may be a practiced odontologist, and may be able to deal with all pathological conditions found in the region which this special practice comprises; it is wise, however, to remember that the patient has other organs fully as important as his teeth, and to bear in mind that a local lesion within the mouth may give rise to symptoms referred, by the patient, to some other portion of the body.

The intimate relation between dental caries and certain general diseases, such as diabetes, is well known. No member of this audience would think for an instant of treating a case of extensive or progressive dental caries without first inquiring as to whether or not the patient were diabetic. In other words, the odontologist must be a medical practitioner before he can conscientiously and efficiently practice his specialty.

I now beg to call your attention to the reverse condition; that is, to symptoms produced in other regions of the body by diseased teeth. From a somewhat extended clinical experience, I have made it a rule to examine the teeth in every case applying to me for relief from otalgia, tinnitus aurium, or progressive impairment of the hearing. When we consider the intimate relation that exists between the innervation of the organ of hearing and the dental

apparatus, it can be easily understood that any pathological condition in the one apparatus may cause symptoms referable to the other. The entire sensory innervation of the ear is derived from the fifth or trigeminal nerve; this nerve, through its superior and inferior maxillary branches, is the sensory nerve of the teeth. If we bear in mind the extensive ganglionic communications of the fifth nerve through Meckel's ganglion and the otic ganglion, both with the other sensory nerves and with the sympathetic nervous system, it will be easy to understand how any disturbance in the domain of one of the branches of the nerve may cause symptoms referred to some remote organ. In other words, dental caries may cause a series of reflex symptoms referred to other organs of the body more or less remote. The simplest of these reflex phenomena is otalgia, or pain in the ear. Both from personal observation (I have a bad lower molar) and from clinical experience, I find that a carious tooth may produce all the symptoms of an acute inflammation within the tympanum.

In our otological clinics earache is one of the most common symptoms of which patients complain. I make it an invariable rule, after examining the ear, to look into the mouth and see if there are any diseased teeth. Naturally, if the otoscopic examination reveals the presence of an acute inflammation, either in the external auditory canal or the middle ear, the cause of the otalgia is perfectly evident. In a large number of cases, however, especially in children, we find that the patient complains of a severe earache. An examination reveals the external auditory canal perfectly normal; the drum membrane is found to be normal in position, natural in color, and presenting absolutely no evidence of any inflammatory process within the middle ear. In spite of this, the patient is suffering from otalgia, or pain referred to the ear. In numerous cases of this character examination of the mouth has revealed carious teeth. In adult patients usually one of the wisdom-teeth is at fault, but in children the symptom is not infrequently a result of caries of the first molar.

I do not believe that the process of dentition itself can produce pain of this character. Dentition is a perfectly physiological process, and many of the diseases of childhood formerly attributed to dentition have since been found to be due to some actual disease either of the *primæ viæ* or of some portion of the upper air tract. The restlessness of children during the period of dentition, with the continual crying at night, as if suffering from severe pain, has been proven to be due in a very large majority of cases to acute inflammation of the middle ear. These cases are always attended by fever, the temperature sometimes running very high. As before stated, dentition is a perfectly physiological process, and is unattended by any rise in temperature. Fever, therefore, is an indication that the cause of the pain is not due to the eruption of the teeth.

Now for this other class of cases to which I desire to call attention (that is, those in which there is severe pain, no rise of temperature, and no evidences of any inflammatory process within the ear, although the patient complains of severe earache). This series of

symptoms is found in older children and adults, and not in infants. This pain, as before stated, is frequently due to a diseased tooth, and the patient is really suffering from toothache, although the pain is referred to the ear. In this connection it might not be out of place to mention that the old housewives' remedy for toothache was the introduction of some counter-irritant into the external auditory canal. It seems as if these ladies could occasionally teach the medical profession something about reflex phenomena.

I have spoken only of cases of pronounced otalgia. These, as before stated, are frequently found in older children and sometimes in adults. In adult life, however, the symptoms are often more complicated. The patient may complain of a feeling of oppression, stuffiness, and pressure in one or the other ear. This symptom may be intermittent, and, while not amounting to actual pain, may cause considerable discomfort. Examination made by means of the speculum will reveal nothing abnormal, or at most a slight retraction of the drum membrane. On inflating the ear by means of the Eustachian catheter, the Eustachian tube will be found to be slightly narrowed. At first thought it would seem as though the local condition found in the tube might be sufficient to account for the sense of discomfort in the ear; further investigation, however, will demonstrate that the relief of the tubal narrowing does not cause the pain to disappear. We next examine the mouth. A carious tooth is found, and when it is either extracted or properly treated, all aural symptoms disappear. Cases of this kind have been so frequently seen that I have made it a rule to examine the teeth in all cases either of otalgia or of what may be called aural discomfort, where the cause of the pain could not be directly traced to an acute inflammatory condition either of the external meatus or of the middle ear. It is a well-known fact that one of the earliest symptoms of cancer of the larynx is earache. Here the pain is reflex in character and depends upon the intimate relation which exists between the innervation of the larynx and that of the external auditory canal and of the middle ear. It would be as culpable to overlook the etiological condition dependent upon malignant diseases of the larynx as to overlook the same condition due to dental caries. The otologist would be as little excusable for neglecting the examination of the teeth in the one case as the examination of the larynx in the other.

Another subject which deserves attention is the possible effect which dental caries may exercise upon the trophic nerves of the tympanum. Speaking in the broad sense, we know that any interference with the nervous apparatus of any portion of the body may lead to pronounced local manifestations, due to malnutrition of the tissues. Thus in the disease commonly known as "shingles," or, technically, as *Herpes zoster*, there is a neuritis of the intercostal nerves. In this disease we find a cutaneous eruption following the course of these nerves. In other words, the branches of the intercostal nerves affected preside over the nutrition of the integument along the course of their distribution. Interference with their function causes an eruption over the area which they supply, due to

malnutrition of the tissues. Reasoning from analogy, it seems more than probable that a carious tooth may so affect the nerve supply of the middle ear as to cause tissue changes within the mucous membrane of the tympanum. These tissue changes may result either in an impairment of hearing, or a perversion of the function of the ear; that is, they may cause tinnitus aurium or vertigo. In cases of impaired audition of long standing, or in any patient suffering from severe tinnitus, I never fail to examine the teeth in the hope of finding a possible cause of aural symptoms. I am not prepared to state that carious teeth are responsible for actual tissue changes in the middle ear, but I am perfectly willing to assert that no otologist does his full duty to his patient unless he excludes such possible causes of aural symptoms. Aside from actual tissue changes occurring within the middle ear as a result of dental caries, it is quite logical to suppose that the vaso-motor nerves, not only of the middle ear, but also of the labyrinth, may be influenced materially by caries of the teeth. Following this course of reasoning, it would be wise to examine the teeth in all cases of intermittent tinnitus, or in cases where the power of audition is occasionally reduced without apparent cause. The vaso-motor nerves, not only of the middle ear, but of the labyrinth itself, are in such intimate relation with the middle and inferior branches of the trigeminal nerve that a pathological condition of one portion of the nerve might cause circulatory disturbances in some remote region. In other words, carious teeth might cause a dilatation either of the labyrinthine or of the tympanic vessels, producing either impairment of audition or the perversion of the auditory function; that is, tinnitus.

I do not believe that dental caries can in any way cause an acute inflammatory process of the middle ear by reflex action. It is quite possible that carious teeth may cause middle-ear inflammation, either directly, by the introduction of germs into the tympanum through the Eustachian tube, or indirectly through the infection of the accessory sinuses of the nose. Such an inflammation would not, however, come within the limits of this paper.

In closing, I wish again to emphasize the importance of a thorough examination of the teeth not only in all cases of otalgia not due to acute inflammatory conditions in the external or middle ear, but also in cases of tinnitus aurium, or of progressive impairment of audition in which the pathological factor is obscure.

FORMATION OF THE VOICE AND SPEECH.

BY DR. GEO. A. ROUSSEL.

(Read before the American Dental Club of Paris, January 6, 1900.)

ON March 13, 1899, Dr. Marege presented before the Académie des Sciences a communication upon this same subject. I had the honor of being associated with Dr. Marege in some of his experiments, the impressions and models (some of which I now show you) being made by me from my own mouth.

The human voice is produced by the thin membranous folds each side of the larynx, called vocal cords, being thrown into vibration by a blast of air from below, this vibration being communicated to the air in the chambers and passages above. I will not go into further physiological details, with which you are all familiar.

The variation in vocal sounds which gives rise to speech is not produced in the larynx, but in the throat, mouth, and nose. When the blast of air is thus modified, but not accompanied by any vocal sound, it gives rise to a whisper (this is what I am going to show you later on), but when a vocal tone is produced at the same time we have the ordinary speaking aloud.

As vocal tones can only be produced by expiration, we can only speak aloud by means of an expiratory current of air; but a whisper may be produced by an inspiratory as well as by an expiratory current.

Speech is composed of two kinds of sounds: those which must be accompanied by vocal tones are called "vowels"; the others do not need any vocal tone, but are produced by changes in the shape of the resonating chambers, and are called "consonants." As the pronunciation of the consonants is always accompanied by some vowel sound, and as the difference between the vowels is brought about by changes in the shape of the mouth, the distinction between the two sets of sounds is rather artificial than real.

The production of the different "vowel" sounds depends upon such change being brought about in the shape of the mouth, as far as cavity and aperture are concerned, that a "resonator" with a different individual note is formed for each particular vowel.

The sounds called "consonants" are caused by some check or impediment in the course of the blast of air coming from the air passages. Yeo classifies these sounds according to the part at which the obstruction occurs:

1. *Labial*, when the narrowing takes place at the lips, as in pronouncing *b, p, f, v*.

2. *Dental*, when the tongue obstructs when pressed against the hard palate or the teeth, as in pronouncing *d, s, l*.

3. *Guttural*, when the posterior part of the tongue moves toward the soft palate or pharynx, as in pronouncing *k, g, ch, r*.

Yeo also divides the consonants into different groups, according to the kind of movements that produce them:

1. *Explosives* are produced by the sudden removal of the obstruction, as with *p, d, k*.

2. *Aspirates* are continuous sounds caused by the passage of a current of air through a narrow opening, which may be at the lips as with *f*, at the teeth as with *s*, or at the throat as with *ch*.

3. *Resonants* are the sounds requiring some resonance of the vocal cords, while the air current is suddenly checked by closure of the lips as in *m*, or closure of the dental aperture as in *n* or *ng*.

4. *Vibratory*, of which *z* is the example, requiring a peculiar vibration of the vocal cords while either the dental or the guttural aperture is partially closed.

To see what is going on in the mouth during speech I have taken

the impression of the mouth with the lower jaw, the tongue, and the lips in the position they assume when the different sounds are pronounced. From among many models taken, these now before you are examples of what we have obtained.

The method of taking the impressions is as follows, as practiced upon myself: A correct measurement is first obtained of the height of the opening of the jaw during the pronunciation of a certain vowel (*a*, for instance), and a block of wood of the corresponding length is prepared, which is placed between the teeth at the moment of taking the impression, a large piece of very soft modeling composition being used for this purpose. While in this position, with the wax still very soft, I pronounced the vowel *a*, and thus obtained an impression of my buccal cavity when articulating that sound. After cooling off the wax with cold water I was able to remove the impression; then I ran the plaster cast, articulating the upper and the lower parts together and covering the whole with plaster, leaving a hole in front corresponding to the labial opening, and one underneath for the air passage corresponding to the larynx. I had thus a model of the cavity of the mouth during the production of the vowel *a*.

When a continuous blast of air (a pressure equal to a column of mercury seven centimeters in height being sufficient) was passed through that resonator (plaster model) we found that the sound produced was the same as if *a* had been whispered.

We now had to see if the sound which was the same to the ear was theoretically the same.

There are two ways of recording the sounds of the voice, or rather the vibration which produces these sounds. One is by a tracing, or series of curves similar to the pulse trace and by an instrument similar in principle to the sphygmograph, the current of air issuing from the larynx setting into vibration a diaphragm which communicates with a recording needle. The other, which was the method adopted by us, is by the flames of Koenig. The deflection of a flame continuously photographed in series gives a constant series of deviations for a given sound. We can thus by either method analyze the results obtained and extract by calculation the simple sounds that have formed the curve (this is what I. Hermann did, and so artificially decomposed the vocal apparatus into its elements) so as to know the part played by each.

Having reproduced, as indicated above, as nearly as possible the buccal cavity, a blast of air passed through the same (or the resonator) and directed upon the membrane of the manometric capsule, whose flame was photographed after the ordinary method, the result was identical with that obtained directly from the living subject.

The results, however, are not the same with all our models made under the same conditions. We have obtained notes which differ half a tone, and yet a continuous current of air produces the same vowel.

This demonstrates what Dr. Marege said before the Académie des Sciences on March 13, 1899, that "The vocable—that is to say,

the note produced by the buccal resonator—is not alike for the same vowel and the same person.”

Deaf and dumb children in the beginning of their education always pronounce each vowel on the same note that the buccal resonator gives.

In conclusion: A continuous current of air becomes interrupted in passing through the buccal cavity, and this resonator alone suffices to produce the whispered vowel. The vowel becomes sonorous if the current of air has just passed through a reed instrument, to which the vocal cords correspond.

PROCEEDINGS OF SOCIETIES.

THIRD INTERNATIONAL DENTAL CONGRESS, PARIS.

(Continued from page 520.)

FOURTH DAY—SATURDAY, AUGUST 11, 1900—*Continued.*

SECTION V.—PROSTHESIS, DENTAL ORTHOPEDIA, AND FACIAL RESTORATIONS.

Dr. DOUZILLÉ was then called upon by the president to read his paper entitled “A Simple and Effective Appliance for Expansion of the Superior Maxilla.”*

Discussion.

Dr. WEBER. I think that Dr. Douzillé treats in his paper the physiology of regulating operations.

Dr. DOUZILLÉ. I have apologized for doing it, but I wanted to show the appliances.

Dr. WEBER. Several interesting papers on this subject have been published, especially those by Drs. Case, Angle, and Guilford, of the United States. Dr. Douzillé might have consulted those interesting works.

Dr. DOUZILLÉ. This theory on the compression of the osseous cells does not exist anywhere. With regard to the works that you have mentioned, I will say that I did not know of their existence.

The PRESIDENT. The committee of organization got Dr. Douzillé to write on a question that he himself had selected. In this way very interesting papers are produced. We have listened to a very careful study, and to a very good description of the physiology of regulating operations, which, as he has said, is not as yet in any way a settled question. He carried on experiments on animals, which I would advise him to continue. I regret that he should not have been able to show us his preparations, but I hope he will be able to do so on a future occasion. I think that this kind of work should be carried on in a thorough manner. Up to date no one has ever treated this question,—a most interesting one. With regard to the appliance, I consider it very practical. We have always been in difficulty as to the manner of expanding the lower

*This paper is printed in full at page 605 of the present issue.

arch by means of jack-screws, and by means of external force applied with rubber bands acting upon a tooth; but when the posterior surface has to be expanded the work is most difficult. Some time ago I decided to make a series of inclined planes, but I obtained but an imperfect result, and not the successful one obtained by Dr. Douzillé. Hence this appliance, which from a theoretical point of view answers to our demands, and which from a practical standpoint gives us good results, is one which should be recommended. I have to thank Dr. Douzillé for having discussed this question. His remarks upon the physiology of regulating operations are most interesting, and his appliance most ingenious.

The president then called on Dr. POINSOT to read his communication (which here follows), entitled

ON THE EXCLUSIVE USE OF NOBLE METALS FOR RETAINING
DENTAL APPLIANCES AT THEIR POINT OF CONTACT WITH THE
TEETH.

In order to complete our paper read at the Congress of Bordeaux of 1895, on the galvanic action of dental metallic appliances, we will again call your attention to this important question. Five years have elapsed since our last paper was read, and we have the satisfaction of being able to confirm our success in dental prosthesis by the judicious use of noble metals, which have the property of resisting the different acids that are permanent or accidental constituents of the oral fluids. Until now we have used nearly exclusively 18 k. gold for retaining dental appliances, by means of a clasp-like system which retains the piece by exercising a continuous pressure.

The changes in the dental tissues at the point of contact with metallic adjustments, such as bands, stays, or clasps acting like springs, have been differentially studied. At last we know that mechanical abrasions resulting from the pressure of a gold clasp acting like a spring are less serious than those following the use of a gold ring encircling a tooth saturated with acid and pathological saliva. In the last case an electrolytic action is established, which destroys the enamel and dentin of the teeth with varying rapidity. This action results from the great acidity of the bath, and from the various degrees of resistance possessed by the different dental tissues, which are not all in the same state of calcification.

To avoid the inconvenience that I have pointed out, which is considerable, as it prevents the use of necessary appliances, besides causing the destruction of healthy teeth, with acute pains that would discourage the most patient, the iridio-platinum is substituted for 18 k. gold in the bands, stays, or clasps, and all the evil consequences are averted and the desired results are obtained to the satisfaction of the interested parties. The percentage of iridium in the alloy is increased to twenty, thirty, and forty per cent., according to whether it is to be used for a band, a stay, or a clasp. The great difficulty met with in the construction of prosthetic appliances of an alloy of platinum and iridium at thirty per cent. made us relegate the use of this composition to those parts alone that come in con-

tact with the teeth, for in mouths where the saliva is of a feeble acid reaction it is possible to make use of 18 k. gold where it comes into contact with the mucous membranes. We solder the bands, stays, and clasps of iridio-platinum to the gold plates. Under such conditions we have not observed any detrimental change that could be traced to electrolysis or to mechanical abrasion; in fact, the iridio-platinum preserves nearly the original form given to it.

The alloys of noble metals not liable to be attacked by pathological saliva nor to constitute an electric cell are yet to be studied, as we have dealt only with the combinations of platinum and iridium. Analysis of various other alloys has been made by M. Contenau, but they are not as yet sufficiently conclusive to submit them to your consideration.

The iridio-platinum alloy is annealed in a sheet-iron box filled with charcoal powder heated by means of an electric current of 60 to 100 ampères, and even more, or by other means.

The swaging of iridio-platinum plates being more difficult, the metal has to be annealed more frequently than an ordinary platinum plate. At the points to be soldered it is convenient to previously fuse a layer of pure gold. Pure gold must be used for soldering two pieces of iridio-platinum.

The iridio-platinum clasps can be combined with the vulcanite plates.

By following these suggestions the benefits of prosthetic dentistry will increase day after day, on account of the satisfactory results that will be obtained. This will afford us another means of saving teeth which, if lost, in a case where no antagonistic or neighboring teeth are present, would lead to disorders of nutrition.

Dr. Poinsot further said: You all know how exact we must be in prosthetic dentistry. Now, in order to attain this degree of accuracy all kinds of methods and devices have been put into use. In spite of all these efforts, perfection has not been attained. When the model is made it will change according to the consistence and temperature of the plaster used in filling up the impression. If this be of a thin consistence the model will be smaller; if thick the model will be larger. Hence we see that a perfect result cannot be obtained with models that are not exact. In order to avoid these inconveniences I thought that instead of pouring the plaster into the impression I would make use of the galvanoplastic method, with which I would obtain absolutely accurate results. This method I have found perfectly satisfactory.

Discussion.

Dr. ROLLIN. Can this be done in the office, or is it necessary to have a large outfit?

Dr. POINSOT. I began by telling you that about ten years ago I had obtained a slight success, but then I realized the fact that it was impossible to obtain perfect results without the services of a person who had made a specialty of this branch; hence I addressed myself to the chief engineer of the Christophle firm, and through him I have been able to obtain what you have seen. There is but one drawback, and this is that it takes them eight days to make the

models, but the work is perfect. The cost is not excessive; it varies from twelve to fifteen francs. I think that you will agree with me that it is not too much, especially when you consider the absolute accuracy of the work.

I do not vulcanize upon the model, although this would be a good thing to do. I have tried to gild the models, but the action of the sulfur upon the copper takes place notwithstanding the layer of gold which covers the model. The ideal way would be to use tin or zinc in connection with the galvanoplastic method, but this branch is not yet so advanced as to permit such results. You have seen in the models that I have shown you that their thickness is considerable.

I think that the galvanoplastic will do away with the old methods, as by this plan models can be obtained from which surprisingly accurate plates are secured.

Dr. GUERINI. In the First Italian Congress, held in Naples during the past month, I made plates upon plaster and metal models by means of the galvanoplastic process, and I showed copper and silver plates. I will show them to you to-morrow, and I agree with you that it is an ideal process.

The PRESIDENT. At the Exposition some of the excellent results obtained by Dr. Vagena with galvanoplastics can be seen.

The president then called on Dr. DELAIR, who read the following description of his appliances for facial prosthesis:

PRESENTATION OF PROSTHETIC APPLIANCES.

The appliances that I have the honor of presenting to the Congress are of two varieties. The first are for the purpose of remedying the more or less extended loss of osseous tissue of the maxillæ, and hence of correcting the deformity of the face. With regard to adaptation, they only differ from those generally constructed in the fact that they are hollow in the principal portion. The plate is made of gold, and supports the artificial teeth; the hollow chamber is made of vulcanized rubber. These appliances are in consequence relatively light,—a great advantage to those who have to wear them. At the practical demonstrations I will show the method of making them. I do not doubt that those who make a specialty of this branch will adopt this method in the future, as it will permit of the decrease in weight of appliances that are sometimes a great deal more voluminous than those that I will now show.

No. 1. Destruction of an extended portion of the right side of the superior maxilla, as the consequence of a fall from a carriage. The fragment was resting against the maxillary sinus. Loss of four molars. Patient a man thirty years of age.

No. 2. Man fifty years of age suffered from a kick of a horse that caused the loss of the anterior portion of the inferior maxilla.

No. 3. Destruction of the right side of the hard palate, of the alveolar wall, and of five teeth in a man of fifty-five years, as the consequence of necrosis.

No. 4. Loss of a portion of the superior maxilla and of six teeth from phosphor-necrosis. This patient, a woman twenty-eight years of age, also lost the nose from this terrible disease.

Facial Prosthesis.—Of all the diseases which afflict humanity, those which affect the integrity of the tissues are the most distressing. The anguish of the patient becomes more intense by the unreasonable shame which his condition causes him to feel, and also by the involuntary horror which he inspires in those that surround him. The person that loses a limb, the speech, sight, or hearing, or even the mental capacities, is the object of delicate attentions by all those who come in contact with him. On the contrary; one that loses any portion of the face as the consequence of an accident or disease, or of heredity, suffers daily from the repulsiveness of his appearance. For many of these patients suicide ends their sufferings.

For a long time these mutilated people have appealed to the art of the dentist, for nobody else could help them to so great advantage. Skillful mechanical dentists can construct, according to the anatomical data furnished them by experienced surgeons, appliances of precise adjustment and natural appearance.

My purpose will be to give a description of these works of art, generally made of hardened rubber, of celluloid, or of aluminum. I will say that during the twenty-six years I have been practicing dentistry I have always observed the difficulties patients have as to the support of appliances for facial restoration, these necessarily having hard borders which come in contact with tissues already too much predisposed to inflammation. Eighteen years ago I conceived the idea of making facial appliances in smooth and soft rubber with an inner frame of gold. I have uniformly been successful since that time.

To make these appliances metal models are necessary. The making of these is not devoid of difficulties. They are also more expensive, but this ought not to be a consideration as long as the results are good. Brass is very well adapted for this purpose.

I devised for the adaptation of these appliances a small mechanism which works between the artificial lip and teeth; the weight is relatively slight; the mechanism is made of pure gold. Two gold bars soldered behind the mask are introduced by means of slight pressure into two notched catches, which are supported by a framework soldered to a plate. The gold bars are connected to the facial mask, which can be adjusted at the proper distance by means of an ingenious device. In certain cases the gold can be substituted by aluminum, so as to make the piece lighter in weight, but only in those places where the mucous secretions do not remain continuously. The facial appliance is hence supported by a plate, to which it is united by means of hooks and hinges. It can also be supported by means of spectacles or clamps, according to the requirements of the case. These pieces with soft borders adapt themselves perfectly to the face on account of their flexibility, and even follow the movements of the muscles. For this reason they do not irritate the fleshy contours.

Three patients (Nos. 1, 6, and 7) who wear this kind of appliances consented to come with me to Paris, and it will be a great honor for me to be able to give you the *résumé* of what I have

accomplished during my professional career, and to show you at the same time the proofs substantiating my statements.

List of Appliances for Facial Restorations.—No. 1. Gold plate supporting several artificial teeth, a movable velum palati, and the upper lip. Patient a man thirty-six years of age. Hereditary infirmity. Appliance in use since 1885.

No. 2. Upper plate retained by good and solid teeth. This piece has attached to it in front of the artificial teeth the gold mechanism already referred to. To this mechanism is attached a mask of soft rubber with internal gold frame, which replaces the entire upper lip, the nose, the right cheek, part of the left cheek, and the lower portion of the forehead. The patient is a woman fifty years of age, and has been wearing the appliance since 1885. The infirmity was caused by a cancerous growth.

No. 3. The patient, a woman of thirty-four years, has been wearing the appliance since 1888. This patient was in the following condition: The hard palate was partly destroyed, and the opening closed with a gold obturator. The upper lip was partly gone, and the nose entirely wanting. It was impossible to adapt to the plate a mechanism for the retention of the mask, for what little remained of the lip was useless for this purpose, as will be seen in the model. The two appliances are united by means of a hinge to the upper portion of the nose, and are retained by means of spectacles.

No. 4. Total loss of the nose and of a portion of the superior maxilla in a woman twenty-eight years of age, as the consequence of phosphor-necrosis.

No. 5. Fracture and ablation of the nose. Patient a young man of twenty-eight years. Appliance in use since 1891.

No. 6. Patient a man twenty-eight years of age. He was at the explosion of melinite which took place at the arsenal at Bourges, but came out nearly uninjured. Some time after he began to suffer from a severe form of expulsive gingivitis (pyorrhea alveolaris). All his upper teeth became so loose that they had to be extracted; the anterior portion of the maxilla and osseous framework of the nose became loose. An operation was performed upon his nose. This resulted in the loss of part of this organ. I will present this patient to the Congress.

The lower jaw, which is nearly perfect, supports a partial piece provided with strong gold springs, holding in place a large gold plate that supports fourteen artificial teeth. In front of where the lacking portion of the maxilla should be is attached a gold device on the principle of a double lever. The mask is adjusted with precision, and the thick beard of this man conceals the artificial substitution. The appliance, which is heavy, is retained above by a pair of spectacles.

No. 7. A man of fifty-six years. In an accident in a factory he was struck on the nose by a piece of iron. Many years afterward exfoliation took place, part of the left cheek being destroyed and half of the nose disappearing. This appliance is harder to adapt than an entire nose. It is retained above by a pair of spectacles,

and below by a gold device resting on the right side of the nose.

I will also show a variety of artificial noses, in order that my *confrères* may convince themselves of the flexibility of my appliances, and also that they may see the advantages that they may derive from their use.

Discussion.

The PRESIDENT. I asked Dr. Delair to come down to show you his prosthetic work. The work that he has accomplished through self-concentration is remarkable. These ingenious results are due to his personal ability alone, for he has never received instruction or special training in this branch. If Dr. Delair could be located in a large city, and come in contact with surgeons who could guide and help him to become known, he would not be the first *confrère* who was surprised at our admiration for his work.

The next number on the program was the following paper, by Dr. VINCENZO GUERINI, of Naples, entitled

CORRECTION OF A CASE OF PROGNATHISM OF THE SUPERIOR MAXILLA ACCOMPANIED WITH ANTEVERSION OF THE INCISORS.

On October 28, 1894, Miss A., twenty-eight years of age, presented herself, accompanied by her parents, at my office to consult me in regard to a great deformity of the superior maxilla. The face of this young woman was deformed by an exceptionally marked prognathism, accompanied by projection of the four incisors (anteversion). She had been sent to me by one of my colleagues, who had told her that it might be possible that I could modify the conditions by means of a regulating operation, and hence the patient was waiting my prognosis with great anxiety.

She had to abandon all hope when I told her that a regulating operation was impossible.

These deformed conditions were due to an exaggerated projection of the alveolar process, which caused the extremities of the four incisors, especially of the centrals, to remain separated from the lower incisors by a space of more than two centimeters. Consequently when she closed her mouth not only the incisors but also a portion of the gums were not covered by the lips. She never knew what it meant to have the lips together. I told her that the deformity could be corrected, if not entirely, at least partially, by extracting the four incisors, which were of unsightly appearance, and by applying, after the wounds made by the operation had healed, artificial incisors anatomically arranged. As there was no other way of proceeding, the parents and the patient accepted my proposition, and asked me to operate in their home.

The next day I went to their home, after having materially modified my plan. I had conceived a new operation in connection with the present case, but I did not want to speak of it to the patient nor her family for fear of inspiring them with doubt as to its success.

After having made the necessary preparations to anesthetize the patient and for scrupulous antisepsis, I chloroformed her and

extracted the four incisors. I then separated the gums from the alveoli by means of a bistoury, from the canine on the right side to the one on the left. I then folded that segment of gum-tissue upward, and by means of an osteotome and a file removed all the external alveolar border, part of the partitions, and also some of the internal wall at about the middle line. With injections of a solution of mercury bichlorid I freed the region operated upon from the most minute *débris* and from some blood-clots, and then covered it with the fold of gum-tissue. It projected slightly in the center. I trimmed off the surplus, and then by means of a suture joined this fold to the palatal one.

The operation was concluded while the patient was yet unconscious, but after a few minutes she awakened; and the first thing she did was to touch her lips and ask for a mirror. As soon as she saw how much her appearance had improved she expressed her joy by convulsive laughter. I left the patient after having prescribed a simple antiseptic and astringent mouth-wash, that I recommended her to use frequently.

The next day I found that everything was going on very well. She told me that she had not experienced any pain during or after the operation, and expressed to me her thankfulness.

On the fourth day I saw that the wound had healed by first intention. I removed the suture, and promised that in a month I would make her an appliance that would not be detected.

After thirty-two days the gums had returned to their physiological state, and I took an impression. Three days after the patient could laugh, for her dentition was complete and her incisors were beautiful, being regular and also uniform in color. The necks of the four artificial teeth projected slightly in the gum-tissue, in such a manner that the teeth did not look artificial.

Conclusion.—In certain cases of prognathism a correction may be brought about by extraction of the incisors, with the resection of a portion of the alveolar border and the use of artificial teeth.

Discussion.

Dr. PONT. I congratulate Dr. Guerini on the results that he has obtained. He has performed a true surgical operation. Yesterday he told us that he was only a dentist; to-day we have seen that he can, if necessary, be a surgeon. Nevertheless I will take the liberty of asking him why he has not shown us the models before and after the operation. We could have examined the case and decided if such a serious operation was really needful. Of course Dr. Guerini thought that the intervention was necessary, but our opinion might have been different. We must distinguish between two cases,—one in which the incisors are healthy and can be preserved, and the other when they are attacked with erosions and cannot be preserved. If the teeth can be saved I think that the operation should not be performed. If, on the contrary, they cannot be preserved, the utility of a resection of the alveolar process can be questioned. Former methods should be used, and as a last resource this operation should be performed. I want to point out to Dr. Guerini the seriousness of this operation.

Dr. WEBER. Dr. Pont has just said what I wanted to say with regard to the absence of models showing the condition of things before and after the operation. It is very interesting from a surgical standpoint to ascertain whether the operation was necessary. You have seen from the papers that have been read that prognathism can be corrected in a general way without surgical intervention, and with satisfactory results. The surgical treatment has not entered as yet into the domain of the dentist, but, when resorted to, its use is determined by an indication that we cannot verify; hence I regret the absence of models.

Dr. FONTANELLE. A few years ago I had a case analogous to that of our *confrère*. The incisors were badly decayed, and when the patient was in a resting attitude, with the mouth closed, the upper incisors completely covered the lower lip. I extracted the four incisors, and also the canines, which were in a bad condition, and the alveolar resorption was sufficient to bring about a normal articulation. After a month or six weeks I made a plate to replace the lost teeth, and, without the necessity of resecting the alveoli, the case was brought to a successful end.

The PRESIDENT. I would like to make a few remarks to Dr. Guerini. Two things mentioned in his communication have surprised me very much. First, the attitude of his patient. Dr. Guerini told us that this young girl was very impatient to know the result of the operation. If so, why did not her parents attend to such a deformity before she got to be twenty-six years of age, and before those teeth were entirely lost? Dr. Guerini has told us that this young lady had no wish to preserve them, as they were in such a bad condition.

On the other hand, this surgical operation cannot be considered as a regulating operation. We can only refer to a regulating operation as such when it permits of the preservation of the organs to be regulated, and not when the organs are extracted or modified.

In spite of all this, the method indicated by our *confrère* could be very serviceable, as Dr. Fontanelle has proved; but his operation was limited to the extraction of teeth, and did not include the resection of the external alveolar border and of part of the internal, as did that performed by Dr. Guerini.

Dr. GUERINI. I will ask you to excuse me if I did not express myself in a correct manner. First, you must know that I exhibited at the National Exposition of Medicine of Genoa three showcases. I had four, and after great effort I succeeded in bringing one, having obtained this permission from the Secretary of Public Instruction. I made a demand that I be allowed to bring the other three showcases, one of which was reserved for plaster models. In this case I have the models of the most important regulating operations that I have made. I have done thirty-six of these operations, among which were some quite important ones. I hope that I will have the opportunity to show all that I have made in connection with regulating, of which branch I have made a specialty.

With regard to the case of which I have spoken, the young lady belongs to a very wealthy family, but neither she nor anybody in

the family ever thought of correcting the deformity in question. Objections have been raised that the operation might not have been necessary, and that the same result could have been obtained by natural processes. If Dr. Fontanelle will take into consideration the fact that my case was more serious than his, he will see that an operation could not have been avoided. If I, with a tendency emphatically against extractions and surgical intervention, yet performed this operation, it was because I considered it absolutely necessary.

Dr. FONTANELLE. After the extractions I waited a month. At this time, when a great improvement was already noticeable, a first appliance was made. This the patient used for about a year, but after this time I observed a new resorption. I made a new appliance, which gave me perfect satisfaction.

Dr. GUERINI. I could not have my patient, whose condition was more serious, confined for months to one room. I had to adapt myself to circumstances, which, as I have explained, were very serious.

The PRESIDENT. We must thank Dr. Guerini for his paper. He has reminded us that he has made a specialty of prosthesis for a long time. His reputation as an able prosthetic dentist is well known to us all. We are glad to congratulate him on his interesting communication.

Adjourned at 6 P.M.

SECTION VI.—DENTAL EDUCATION.

The president called the session to order at 4.15 P.M.

MONS. G. LEMERLE FILS then read his communication (of which an abstract follows), entitled

THE TEACHING OF THE OPERATIVE TECHNIQUE OF EXTRACTIONS UPON THE CADAVER.

Among the questions that were prepared for this Congress were several which related to the advantages that dental students may derive from operating upon the cadaver. The essayist stated that it was his opinion that the dental student could derive much benefit by practicing the operation of extracting teeth upon the cadaver, as he had noted the following facts:

First. The placing of the forceps is similarly accomplished in the living as in the dead.

Second. The resistance offered by the dead tissues is nearly identical with that found in the living tissues. I found differences only in the fragility of the alveolar plates, which fracture very easily during the course of the extraction. This fragility does not vary much with the freshness of the body.

The sound caused by the extraction is not perceptible in the living, on account of the humid condition of the tissues, or because the cries or the respirations conceal it. On the cadaver, on the contrary, these noises are very plain and distinct, and are always the same in the corresponding group of teeth: (1) For the incisors, canines, and bicuspid during the luxation a clapping sound is

heard. (2) For the molars a prolonged cracking is heard when one of the alveolar walls breaks. (3) There is also another sound heard when the alveolar plate between the roots breaks.

Although these sounds are not clearly heard when the operation is performed upon a living subject, it may be possible to use them for the teaching of extractions upon the cadaver. In any case, there is no doubt that extractions could be advantageously learned by practicing upon the cadaver, especially the manner of placing the forceps and the different movements required to extract the teeth. In fact, the professor when operating upon a nervous and sick patient cannot stop at every moment and explain the different steps of the operation; but if he would demonstrate upon the cadaver, every step of the extraction would be seen by the student. These are the principal and most general advantages to be derived from this method of teaching.

Several obstacles have been met with, the removal of which would render the demonstrations more easy.

The first of these obstacles is the position of the body. In the dissecting room the bodies lie in a horizontal position, and the extractions performed in this way are not analogous to those performed on patients sitting in the dental chair. They have some analogy to the operations performed on patients under the influence of chloroform.

Another obstacle found while operating upon a body in the horizontal position is that when a lower tooth is to be extracted pressure from above downward is exercised against the mandible, tending to open the mouth. When the lower jaw is pushed downward the soft parts of the infra-hyoid region penetrate into the buccal cavity; the tongue goes against the palate; the view of the molars is obstructed, and the operation becomes very difficult.

To remedy the first of these inconveniences, due to the horizontal position, the essayist tried to make the extractions with the body in a sitting position, but was hindered by its inertia. The body tends to slip all the time, and the head moves in every direction if not firmly held by the operator's left arm.

The second inconvenience—that is, the elevation of the infra-hyoid region—occurs in the same way when the subject is in a sitting position; hence he concluded that the sitting position did not remedy these obstacles. Besides, it seems more rational that if the student is to practice upon the cadaver, he should do it under conditions absolutely identical with those which he will meet in the case of a patient. It is meant by this that he should operate with the body placed in a chair in the position requisite for the particular operation.

For these reasons an endeavor was made to remove the obstacles referred to, as follows: First, it was thought that if the head could be separated from the trunk and fixed to a chair the annoying mobility of the entire body could be avoided, and the student would be saved the trouble of giving different positions to the chair according to the tooth to be extracted. This, however, did not prevent the raising of the infra-hyoid region into the buccal cavity

and the lowering of the inferior maxilla. To avoid this inconvenience it was necessary that the downward pressure exercised from above by the operator when extracting lower teeth should immediately be transmitted to the hard tissues, avoiding the interference of the soft parts of the floor of the mouth. With these purposes in view a head was prepared by the essayist in the following manner: He severed the neck of a cadaver a little under the hyoid bone, and at about the level of the external occipital protuberance; he then removed all the soft tissues as far as the atlas. He disarticulated the atlas, being careful not to disturb the posterior wall of the pharynx. He obtained a solid basis,—that is, the foramen magnum,—and when he lowered the mandible the infrahyoid region followed the movement of the jaw, and did not fill up the buccal cavity. He then fixed the head in the following manner: After trephining the cranium a little behind the bregma, in order to obtain an opening perpendicular to the foramen magnum, a metallic rod was fixed to a truncated cone, this cone being mounted upon an appliance similar to the head-rest of a dental chair, to give the required positions. Another piece, which was placed against the occiput, helped to maintain the head in position. All these pieces are fixed to a metallic arm, which can be adjusted to any chair. To place the head in position the metallic rod is passed through the foramen magnum and through the trephined point on the vault of the cranium. It is then adjusted to the chair.

Heads prepared in this way can serve also for dissecting purposes, as they take up less room than entire bodies, and also because all the inconveniences of operating upon bodies in the horizontal position are overcome.

It is certain that the student can learn to extract teeth without any previous training in the dissecting-room, but I believe that only through demonstrations upon the cadaver will the professor be in a position to perfectly explain an operative method.

It is not possible to demonstrate upon a living subject the different steps included in the operation, as it is the duty of the dentist to work as quickly as possible in order to avoid all unnecessary pain. Besides, the patients in the clinics of schools are very limited, and it happens that the students perform but a limited number of extractions.

Discussion.

Dr. Roy. I am glad to have listened to the interesting communication by M. Lemerle fils. I must confess that when I saw the title of this communication I did not know what he could devise in the matter of teaching extracting operations upon the cadaver. I tried to extract teeth from dead bodies when I was a student of medicine, and I was very much surprised at the many difficulties encountered in such operations. These difficulties were caused partly by the horizontal position of the body, and especially by the difficulty of maintaining the head in a steady position, considerable effort being necessary to accomplish this. I am very glad to have seen the little appliance that M. Lemerle fils has had constructed. It is very interesting, and will render much service.

Dr. Roy made a few more remarks, and concluded by congratulating M. Lemerle on his appliance.

The PRESIDENT. We thank you for your ingenious appliance, which will be of great service to students.

The president then called on Dr. L. RICHARD-CHAUVIN, who gave a condensed epitome of his article (of which an abstract follows) entitled

THE TECHNICAL AND PRACTICAL TEACHING OF OPERATIVE DENTISTRY IN THE FRENCH DENTAL SCHOOLS.

Operative dentistry is the most important among the specialties which constitute dentistry. It has developed during the last few years to such an extent that a reformation in its teaching has become absolutely necessary. This reform does not refer to changes in the details of the work, such as are brought about in daily practice, but in important reforms in the professional teaching.

We will recall the fact that operative dentistry did not exist until the creation of the Baltimore Dental College. Since the first school was established—that is, in less than sixty years—a radical change has taken place. Operative dentistry has become a science, and in the hands of skillful operators it has done very much good to suffering humanity. Under the *régime* of the methodic conservation of teeth it would seem that prosthetic dentistry would decline, but this is not so; prosthesis is developing, and on account of the use of gold and porcelain crowns and bridges is very intimately connected with operative dentistry.

In order to justify a demand for reforms and have any probability of success it is essential (1) that the existing conditions should require it; (2) that the causes of the existing conditions should be pointed out; (3) that the manner of remedying these defects should be indicated, and (4), in connection with the Congress, that national shall be separated from international or general questions.

To attain such an end it is necessary to outline the actual state of operative dentistry with regard to the public interests, to students, to future practitioners, to the teaching methods followed in the different dental schools, and to the legal status.

From the standpoint of our patients, operative dentistry represents in a condensed way the surgical and manual dental therapeutics. It is necessary to have a complete knowledge of dental pathology in order to be able to make a rational use of therapeutics and to have acquired through study and practice the science of diagnosing. The educated dentist is not liable, if he remains within the limits of his specialty, to commit serious errors of diagnosis. The teaching in the schools is sufficient to produce able clinicians, capable in the great majority of cases of giving relief to the patient. This excellent result would be useless if it were not followed by the repair of the injured organ to the extent of enabling it to perform its proper physiological functions. This is the aim of operative dentistry.

What should we understand by the repair of dental lesions?

First. The abolition of pain in cases of odontalgia.

Second. The rectification of the changes resulting from these lesions.

Third. Restoration of the substance which the organ has lost.

As to pain, we know that with the elements of diagnosis at the disposal of dentistry there is, practically speaking, no variety of pain that cannot be subdued except in those desperate cases in which extraction has to be resorted to.

Dental caries of all degrees of intensity can be treated by a great variety of methods leading to the same end. The successful treatment of the diseases of the teeth is a result toward which the skillful operator directs his efforts, and which he is sure of attaining unless unexpected accidents occur.

The restoration of the injured organs constitutes the most important part of operative dentistry; that part which complements the results obtained by the treatment and assures a new condition of things, whose stability will vary according to the thoroughness with which the operation has been performed.

If we add the treatment of the varieties of gingivitis, which is almost exclusively of a surgical nature, to the treatment and restoration of teeth, we shall have reviewed in a general way the cycle of operative dentistry, which, from the standpoint of the advantages that the patients derive from it, presents itself in the following manner:

First. The treatment of the diseases of the gums, whatever their aspect, form, or seriousness, is within the limits of operative dentistry. The manual treatment demands more attention and ability than is generally thought, but the prognosis is always favorable.

Second. The abolition of odontalgic pain is a very delicate operation, and requires a light touch, which is only acquired through experience. The prognosis is good in nearly all cases.

Third. The treatment of carious teeth is a matter demanding great skill. Long experience is required in order to do it methodically and with assurance of good results. Theoretically, the prognosis is always perfect; the practical confirmation of this theory depends on the manual skill of the operator.

Fourth. Lastly, restoration of the teeth, which comprises the preparation of cavities and the restoration of destroyed portions by means of the numerous methods that science and experience have put at the disposal of operative dentistry. This part of operative dentistry requires a long apprenticeship, which will give to the students manual skill and the power to determine judiciously the substance most appropriate to each operation. The prognosis varies according to the influence of the surrounding circumstances. Hygienic care plays a very important rôle. The general state of the health and predisposing conditions affecting the individual are important factors in determining the recurrence of disease or the stability of the bettered condition. Nevertheless, with the observance of indispensable hygienic precautions it can be said that as a rule the results are favorable. Good practitioners would have no difficulty in quoting numerous cases of restoration of teeth that

had been in the most defective condition, and which through their restoration have rendered good service during ten, fifteen, twenty years, and even more.

If we consider the previous statements correct, it will be recognized that modern dental science, from the standpoint of operative dentistry, has reached a degree of perfection sufficient to gain the confidence of the public and to make all feel that the dentist who conscientiously makes use of the known methods can secure for his patients the resulting advantages with a relatively insignificant amount of pain. But, then, is general practice in harmony with the existing state of knowledge? The answer is not doubtful. For every earnest and competent man the actual amount of knowledge is entirely applied only in exceptional cases. The causes of this condition of things are numerous, and it is evidently the students or future practitioners who will be the first victims. Why? What is their legal status and their situation as regards professional training? How do they acquire the technical instruction at the same time that they prepare for the official examinations?

Dr. Richard-Chauvin then said that the French dental student had to pass three years in a dental school before he was permitted to pass the official examinations, and that those examinations were divided into three parts,—two extra-professional and one technical. Before the creation of these examinations the dental profession was composed of mechanical dentists, who formed the majority, of a few physicians, and, it must also be said, of disqualified individuals of all trades. The schools opened to the young men of the middle class the entrance into a profession both manual and scientific, which could not fail to interest them.

During the first session of the school the student body was composed nearly exclusively of mechanical dentists having a certain amount of experience, but from the second year on a new element entered, and their number surpassed considerably the primitive element.

To the mechanical dentists the law accorded an exemption which permitted their entrance into the last year of study. The new ones went through the entire course of two years, which was very soon increased to three. The three-year *régime* seemed to be perfect, and from the examinations it was difficult to determine to what group the student belonged. The mechanical dentists were obliged to study in order to improve their education, and they acquired gradually the elements of dental science, but were exceptionally successful in the technical examinations; one year was all that they required in order to become good operators. Many professors are of this origin. Those of the other group, who have also become members of the teaching staff, after having passed three years in the study of operative and prosthetic dentistry, became true professional men, and the two elements seemed to become fused. Nevertheless, the observer could recognize a great theoretical superiority in one group, while the other was far superior in the true dental field; that is, in operative and prosthetic dentistry. It was rational to think that in time changes would be brought about in

the established *régime*, as the professional requirements were being transformed and increased, and very soon the necessity for increasing the course to four or five years would be recognized. The new law eliminated the mechanical dentists from the liberal side of the profession.

A few rare privileged beings, a few holders of scholarships, and those very exceptional workers who, besides working for their living, find time to pursue the secondary studies required by the law and to go through the three-year dental course are the only ones found to-day in the schools. They alone remain of a class of students which has given brilliant practitioners. The student body of to-day is composed of college men possessing the necessary requirements, and of a few physicians. This change has resulted in lowering the average technical knowledge of the students of to-day as compared with that of their predecessors. In pointing out this fact we are interpreting the feelings of those who work for the future of our profession. Are the students of to-day less capable of accomplishing in three years what their predecessors did in the same time, or even in one year? As a fact, the decrease in the technical results is due to other causes.

Under the old *régime* the student devoted five mornings out of six to operative dentistry, the sixth morning being devoted to clinical services. To-day the student only devotes two mornings per week to this work. It is natural that this difference should be noticed in the results. If the number of required operations is increased, the quality of the work will have to diminish.

The essayist gave as an example the number of operations required from the seniors of the Ecole Dentaire de Paris, and praised the care of the demonstrators in seeing that the operations may be performed in the most thorough manner. As it takes so long, however, for the students to perform them, it would be impossible that in practice they could do this. He was prepared to demonstrate that the sufficiently trained dentist can operate in practice in as perfect a manner as the actual conditions demand. Such demonstration would constitute the logical conclusion of this paper.

As said before, only two mornings are devoted to operative dentistry, the other mornings being employed as follows: One for hospital work, one for clinical service, one at the anesthesia clinic, one at the clinic of prosthesis, and one at the clinic for the diseases of the mouth. These attendances could not be profitably canceled. The extension of the professional services brought about the creation of the clinic of prosthesis. In the actual conditions it seems that the student is not fully prepared to meet the demands of his patients and the obligations of his profession.

We believe, contrarily to Dr. Godon, that it is not in the office that the technique will be improved. Our profession, besides being very difficult on account of the varieties of combinations which present themselves to the dentist, is painful to him in its exercise. The teaching should cover in a rapid way the treatment of complicated cases, without neglecting the perfection of the operation and without any undue fatigue on the part of the operator. It is cer-

tain that the practitioner who from the beginning abandons the methodic technique because the labor is too great and not sufficiently remunerative will never follow it again. This methodic practice, which is the ideal one for the patient, depends on a continuous training, and it is not possible to abandon it at will.

The consequences of this condition of things are, first, that the public is not treated by the most perfect methods at the disposal of dental science, and that the practitioners that have studied under the present legal *régime* are not sufficiently prepared to thoroughly fulfill the *rôle* that the modern dentist should assume; second, that the responsibility for this situation cannot be imputed to them, for it lies in a misunderstanding between the school and the state.

Dr. Richard-Chauvin then said that the character of the official examinations is such that the student has to sacrifice the time that he should devote to the study of the professional branches in order to pass the accessory examinations. The programs for dental examinations are only nominal ones, for the examiners place the dental students on the same footing as the medical students. This tendency evidently indicates the desire to increase the scientific knowledge of the candidates, but this comparison to the medical students is an arbitrary one, and indicates that the examiners ignore absolutely the needs of the profession. We do not believe that we exaggerate when we say that out of three years one and a half are taken away from the time that should be devoted to practical work.

The essayist then proposed the necessary changes, which embrace thorough reforms in the teaching methods, in the method of selecting the members of the teaching staff, and in a rational division of work between teachers; also in a methodic division of the work in the school. The programs of examinations should be thoroughly determined; the examinations should correspond with the different periods of studies, and the state and the schools should make arrangements in order to increase the course of study.

In conclusion, Dr. Richard-Chauvin said: The idea that the combined work of the most experienced practitioners will have considerable influence on the teaching methods causes me to bring up for your consideration the following resolution:

That a "Permanent Committee for the Teaching of Operative Dentistry" shall be established. It should be of international character, and should be composed of twenty members.

Three representatives should be selected from every nation. One-third of the membership should be renewed every year.

The first mission of this committee should consist in the preparation of a manual of classical operations. The methods and descriptions of operations should be approved by the majority. After the work is completed it should be submitted to the representatives of the associated dental faculties.

The committee would select a commission to discuss its decisions before the representatives of the different schools.

The permanence of the committee is justified by the necessity of introducing all the new methods as soon as possible.

Discussion.

Dr. AGUILAR. I want to congratulate Dr. Richard-Chauvin, and to join him in his demands. Dr. Roy has also formulated resolutions which should be taken into consideration. It seems to me that the communication refers especially to practical teaching; this has a great deal of importance, for we must not forget that if dentistry is a science it is also an art, and in order to be a successful dental practitioner one must be perfectly well acquainted with the practical operations. I believe that before reaching a decision on the proposition of Dr. Chauvin it would be a good plan to hear the opinion of the members of this Section.

Dr. LEMERLE. Dr. Chauvin said that the first group of students that entered the school worked with greater rapidity, and he gave his reasons; it was because the majority of our colleagues of that epoch were originally mechanical dentists. As they were accustomed to handle instruments, they acquired the technique of operative dentistry with great facility. During the first ten years all the leading students were originally mechanical dentists. This confirms the desirability of what Dr. Chauvin demands. A prolongation of the course to four years has been planned in different ways; it has been suggested that the student should be trained in a dental office or in a laboratory of prosthesis; but the thing that is certain is that the students need more manual training.

Dr. ROLLAND. Gentlemen, we are to-day taking up yesterday's discussion, with the difference that to-day we look at it from a practical standpoint. I am glad to see that a competent man like Dr. Chauvin has the same opinion that I have, an opinion acquired during the few years that I was director of the *Ecole Dentaire*. Our students had very good knowledge of anatomy and pathology, and could discuss these questions with ease, but did not know dentistry after they had passed their examinations. As a dental surgeon has to depend exclusively on his profession, and as he will be called upon to practice pure dentistry and not to pass scientific examinations on anatomy and pathology, these studies must be conducted in a regular manner and from a practical standpoint.

Dr. Lemerle said that at first the school was composed of mechanics who may be were not very much advanced from a scientific standpoint, but who were very familiar with the laboratory bench; to-day our students have to meet an enormous amount of scientific requirements, and the result is that good operators are very seldom seen. Some know how to insert a gold filling after one year of study, but very few know anything about prosthetic work. The dentist who is not familiar with prosthesis and who enters into practice may become a good dentist, but we can say that the mechanical dentist who knows prosthesis well will surely become a good practitioner.

How should dental students be instructed? In the way pointed out by Dr. Lemerle a few moments ago. They should have an apprenticeship of three years in a dental office, because if they were required to follow a five years' course in the school they would

prefer to do the work outside of the school; hence they must be required to study dentistry for five years. If prosthesis is acquired in three years the rest of dentistry can be acquired in two years. It is useless for them to study minute anatomy or histology; all that is necessary is that they should have a general knowledge of things,—knowing the position and relation of the different organs, although they will never operate on those parts. How many physicians could pass an examination in anatomy ten years after they leave school? Very few indeed. How often will the dentist go over his anatomy to study the branches of the sciatic nerve or of the femoral artery? It is absolutely tiring out the students who have to pass these examinations besides the school examinations, as they will not get their twelfth inscription or their diploma until the professors of the schools approve the examinations, and then the students will be so tired that very often the best students will pass bad examinations. Consequently enough time should be given so that they may attain gradually a knowledge which they will not forget. If you want to teach the student minute physiology you will step into the domain of hypothesis, and he will be so confused that he will not be either a scientific man or a dentist.

The dental student should pass his examination of anatomy and physiology not at the end of the first year, but at the end of the second. In this way he will have to pass only his examination in pathology at the end of the third year, and this seems to correspond with the fifth examination of the Faculty of Medicine.

We have entered into the question of method and program. I think that a uniform teaching is not a good thing, and it seems to me that it should be left to the professor to decide on the best method to follow in order to inculcate in the student the points that he considers most important.

I will recapitulate by saying that three years of study are sufficient, but previous to the entrance into the dental school the student must have spent three years with a dentist. The candidate should be required to pass an examination before he is admitted to the school. After two years he will pass the examination in anatomy, and after the third year his examination in pathology, surgery, and operative medicine. Maybe he will not be a very distinguished scientist, but he will be a man that will render service to humanity.

Dr. Roy. Gentlemen, I will make some criticism on Dr. Chauvin's paper, for the following reasons:

We all agree as to the justness of his criticisms, but I regret that he should have discussed the question from such a narrow standpoint, for he has proposed an international association. If I say that I recognize the justness of his criticisms, I will not say the same thing of his method of remedying the existing conditions, as he has not outlined it plainly enough. He refers too often to things that already exist; he tries to make an ideal course with rules that are altogether inappropriate. He compares the examinations in operative dentistry with those that are organized by the state and by the faculties of medicine. I believe that this consideration is not just. I think that Dr. Chauvin would have worked at a greater

advantage if he had examined the course of things in foreign countries. I regret that he should not have outlined a program in operative dentistry, as he is so well qualified to do it, and that he should not have stated the time at which the study of operative dentistry should begin. You are not ignorant of the excellence of the practical teaching in the American schools, and nevertheless in some of those schools the practical teaching begins only in the third year. These are things that should be examined in a more profound fashion. In other schools it begins in the second year, and, lastly, in some, as, for instance, in the Royal College of Dental Surgeons of Toronto, an entire year is devoted to the study of operative dentistry upon the cadaver. All these are points that I would have liked Dr. Chauvin to discuss. He has also dwelt upon another very interesting point,—that concerning the state practical examinations. I do not agree with him here. It seems to me impossible that the state should make the students pass a practical examination as we understand it, and I am absolutely against the method of requiring students to pass a series of examinations. This method does not seem to me to be just. The knowledge of a student is proved in a surer way by gold fillings successfully made than by the description of the operation, which the student may know very well. How can you demand that in the state examinations the student should be examined from a practical standpoint? In the *Ecole Dentaire* the practical examinations last six months,—two months every year during three years,—and it is not possible that the state examinations should last so long. In the conclusion of the report that I brought before the consideration of the Congress I expressed myself as follows:

“Because of the impossibility of judging the candidate’s technical ability from a short examination session, the examiners should take into account not only the examination work, but also his record of the year’s work.” [See DENTAL COSMOS, January, 1901, page 63.]

Dr. LEMERLE. That is the case in the *Ecole Dentaire*.

Dr. ROY. Well, I wish it were the case also in the Faculty of Medicine,—instead of being a mere matter of form, that this rule should be enforced; because the practical examination as it is passed to-day is insufficient.

With regard to the international meeting that he proposes, I believe it would be very interesting; not for the narrow field that he proposes, but in view of examining the teaching methods, which is not the same thing as the operating methods. Dr. Chauvin very wisely remarked that he did not think it necessary that one single text-book should be adopted all over the world. There are numerous works by various authors, works written by surgeons, and they are not in any way classical; they may or may not be followed. I would be very glad for a professor, and Dr. Chauvin is very well qualified for this purpose, to do for operative dentistry what has already been done for surgery. I am absolutely against the unification of such manual and its being placed upon the programs of schools; it would be a bad thing.

Dr. LOUP. Dr. Brouardel has told us the actual status of den-

tistry, but this is a condition that will have to change, because the profession is being invaded by the doctor of medicine. Hence why should we make programs for a situation that is only transitory? We should elaborate programs only for an institution that is to remain; ours has to change, and we should use all our efforts in order that it should not change against our welfare. Our situation is to-day slightly on the wane as a consequence of the law of 1894, and we must look out so as not to be invaded by doctors of medicine, and to prevent the Faculty of Medicine from telling us that they will only recognize the doctor of medicine. Our profession would fall into oblivion. We must fight against that; we must have elaborate programs in view of this new situation. We must reach gradually the definite status, which will be that of doctor of medicine for the dentists.

If you will allow me I will present the following resolutions:

Considering that the title and profession of dental surgeon is doomed to disappear,—a condition that can be deduced from the three following significant facts: (1) Because we know that we are in a transitory situation, as the dean of the Faculty of Medicine carefully pointed out to us; (2) because the number of doctors of medicine who take up dentistry is increasing daily; (3) because all the dentists who can afford it make their sons follow the studies leading to the degree in medicine. Lastly, it is curious to see members of the dental profession supporting the dangerous theory of the *status quo* when they profited hurriedly by the new and momentous dispositions of the law of 1894, which permitted the taking up of medical studies without the necessity of possessing a university degree;

Considering also that the dentist has proved the necessity of more extended general studies, as can be seen from the great number of intelligent papers on dental and paradental topics presented to this Congress, and considering that the students of the dental schools will meet greater competition on the part of the doctors of medicine, it would not be honest to allow them to believe that the studies they are actually pursuing will enable them to earn a livelihood, while we know as a fact that it will become harder and harder the greater the number of physicians that take up dentistry;

The Congress issues the following resolutions:

I. Considering the fatal but forced evolution of the dental profession, which will cause the substitution of the dental surgeon by the doctor of medicine, the Congress makes the request that the schools of medicine grant a certain medical equivalence to the dentists of the faculty so that they may be able to pursue their studies so as to acquire the medical degree, and to influence by this means the unification of a title that would be justly respected by every man following the same profession. This change would bring about the gradual and sure evolution of the dental profession. A commission to be formed to study the distribution of exemptions to be granted according to the actual degrees of the dentists.

II. The limit of a year shall be fixed. After this time no one to be allowed to begin the study of dentistry without first having studied medicine.

III. In order to safeguard the technical part of our profession, a commission to be appointed to prepare a special program amalgamating the general medical studies and the dental studies in such a way that it should be possible for the student intending to take up dentistry to direct more attention to the branches for which he has most ability.

IV. Lastly, and in order that the dental schools shall be able to produce the desired effect, they will remain entirely within the limits of purely technical teaching, and will tender to the medical schools the care of the general studies, for which they are admirably fitted.

Dr. AGUILAR. I believe that the demand could be made that special courses on dentistry be established, in order that those that intend to take up dentistry may acquire some theoretical knowledge and economize the time that they will have to pass in the school and to devote more time to practice.

Dr. CHAUVIN. I agree entirely with Dr. Aguilar, and the requests that I put forth should be examined with the others in order to do a complete work. I will also remark to my friend Dr. Lemerle that we do agree, for I do not demand a five years' course, but that the studies should be made easier, and that every branch may be studied appropriately. If a future dentist remains during three years with a dentist or in a special school greater satisfaction will be derived from a three years' course of operative dentistry than for the students under the old *régime*.

It is probable that when essayists were asked to write on dental education the means at their disposal were taken into account, and that Dr. Roy was expected to write on general education; and, as I do not possess his facilities, I had to confine myself to the technical teaching. I did not discuss foreign affairs, because I consider that we have enough to do with our own, and also because in the matter of practical work an opinion cannot be formed unless we see everything that occurs. I did not go to the United States or anywhere else to study the methods of teaching operative dentistry.

I must say that what we see in the printed form seems always very fine. I have been very much interested in the work of Dr. Gires on teaching methods in different countries. I saw how methodically the teaching is carried on in the United States, but what I do not know is the results that they reach. Here we see very skillful American dentists, but we must say that what we see here are those that are on top, and we do not know what the general average is. When I criticize the actual state of things, I refer to the average condition.

To Dr. Loup I will answer that I do not agree with the proposition that he has just submitted. If under the guise of a discussion every one would submit a proposition I do not know where we would be.

The PRESIDENT. I thank Dr. Chauvin for his communication, and if we all do not agree with regard to the treatment, we certainly do agree on the nature of the disease.

(To be continued.)

NEW YORK ODONTOLOGICAL SOCIETY.

A REGULAR meeting of the New York Odontological Society was held on Tuesday evening, November 20, 1900, at the New York Academy of Medicine, No. 17 West Forty-third street, New York city; the president, Dr. W. W. Walker, occupying the chair.

INCIDENTS OF OFFICE PRACTICE.

Dr. L. C. LeROY. Dr. C. W. Many, of Norwalk, Conn., has consulted me in reference to a case of irregularity in which we are to operate conjointly. Models of the jaws and photographs of the face are here, and whatever suggestions as to treatment those present will make will be very gratefully received by both Dr. Many and myself. The patient is a young lady, thirteen years of age, and the models show a condition of irregularity in which the upper six anterior teeth all protrude in a fan-shaped form with spaces between, the lower incisors closing on the gum just behind the upper.

Dr. S. G. PERRY. I have not seen the cast, but I would not venture an opinion from any cast I ever saw. It is not proper or fair for any man to give an opinion without seeing the face, the mouth closed and unclosed, and the expression of the face and mouth; and even then I would require some time to decide. I should like to study it from the internal as well as the external aspect. I do not think the study of the teeth in the mouth is satisfactory, for you cannot look in from the back, as you can from the cast. You should make a careful study of the teeth and the cast before you can come to a conclusion. I would not, therefore, venture an opinion. I will say, as I said before, that I have never been able to jump the bite. There are those who say it can be done, and there seems to be considerable evidence to show that sometimes it is possible.

Dr. R. C. BREWSTER. I feel, as has been said, that it is impossible to come to a satisfactory conclusion as to treatment without study of the patient herself. I have had cases like this from time to time, and probably the things I have used for them are like other members have used. In one the patient was a niece of mine. The lower incisors struck much as these do,—upon the upper gum on the inside. I acted in that case upon the advice of our friend Dr. Kingsley, who gave me a hearing and asked me what I was going to do. I said I did not know, other than make an upper plate upon which the lower incisors would strike, leaving the bicuspid and molars open. I did so, and she wore it for three years, very much to the disgust of her friends and relatives who insisted I was making no effort to reduce the deformity; but during those three years the posterior teeth all elongated, and there was a good space between the biting edges of the inferior incisors and the gum upon which they had formerly closed. After that it was easy to bring back the upper incisors, and the profile of that girl's mouth to-day is quite as good as any I know. Subsequently I had another case such as this model shows, where the like treatment pushed the upper

process out as well as the incisors. As soon as I discovered that I discontinued the operation, and the process and incisors were drawn back as far as the lower teeth would admit, since which time she has been wearing a plate supported by the superior bicuspid, against which the lower incisors articulate, leaving the molars open with a chance to elongate. The case is now doing well, and I think that treatment would be desirable for this patient.

Dr. PERRY. These models ought to be a very good object-lesson for the younger men present, as it shows the harm from extracting the first permanent molars. You see how those teeth are disarticulated? I would not give any advice without seeing the patient, but I can give an opinion as far as the cast and pictures are concerned. I should not extract any teeth. I should use an appliance to straighten the front teeth, closing the spaces.

Dr. LEROY. I have the advantage in having had the models under consideration for some time for study. You know I have expressed myself before the members of this society as to the advisability and the possibility of jumping the bite in cases where necessity requires. I know it can be performed. In this case, although it might be done,—the lower jaw brought forward,—I think it would disfigure the patient. It would extend the chin beyond a line that would be proper. The other alternative would be to draw the upper incisors in, but in doing that we must take into consideration the length of the lower incisor teeth, which at present project far enough to impinge upon the soft tissues of the palate, and even slightly imbed themselves there. It would be impracticable to draw the upper incisor teeth back without some mechanical assistance to prevent pressure upon the lower. It was my intention to place caps or gold crowns over a bicuspid tooth on each side, raising the bite a trifle, so as to allow the first bicuspid teeth of the upper jaw to rest against the bicuspid teeth of the lower jaw and retaining them in that position, allowing by such a performance the two bicuspid and molar teeth to elongate, which I have found will be done in a very short time by retention of the jaws in that position, the lower bicuspid and molar teeth and the upper bicuspid and molar teeth compensating one another; and then by proper regulating appliances to bring the incisors back. There is plenty of room between the incisors and bicuspid to do that, and I think the best regulation can be obtained in that manner.

Dr. A. L. NORTHROP. May I say one word in regard to some remarks Dr. LeRoy has made? He calls attention to the fact that the lower teeth strike against the upper gum. Whatever has caused those teeth to go out has caused the alveolus to be pushed out also. If a *proper* appliance is put on when those teeth come in they will not bend right over, but they will push up and come in, keeping the cutting-edge on the same horizontal plane; and the gum inside will shorten, so that the relative position will be much better than it is now. It will shorten the alveolus inside as well as shorten the teeth, and do away with any necessity for opening the bite.

EDWARD BRADFORD DENCH, M.D., then read the paper of the evening, entitled "Reflex Aural Symptoms Dependent upon Dental Caries."*

Discussion.

Dr. WILLIAM JARVIE. I have listened to the essayist with a great deal of interest and pleasure, and undoubtedly with profit; but it is somewhat difficult for me to follow in the line of the paper, as the class of cases referred to would fall under the observation of the physician rather than that of the dentist. We are frequently called upon to diagnose symptoms in the mouth which are so obscure that it is difficult for us to determine where the cause lies. It is not unusual for a patient to insist that there is pain in the upper jaw when a close examination reveals the cause in the lower. We all know of numerous cases of intense earache and affections of the eye that are caused by defects of the teeth, and of cases of severe neuralgic affections where patients had been under constitutional treatment for months when the cause was in an exposed pulp. One patient who had suffered severely for twelve months with neuralgia before coming to me, told me she had often thought of committing suicide to get relief from her pain. The neuralgia in this case was caused by an exposed pulp in a lower right molar. The patient was quite confident there was no connection between the pain and the teeth, although occasionally she had had a symptom on that side of the face that she thought might be connected with an *upper* tooth.

Another case which came to my observation several years ago was that of the wife of one of the most prominent men of Brooklyn. She had been a sufferer for years, and her physician consulted me about it, wondering if the exciting cause was in her teeth, although she declared they were all in perfect order, and asked me if I would see the lady in consultation with him. I advised that she see her family dentist, which she did, and he extracted a tooth. Why this tooth was selected as a sacrifice I do not know, but the lady got no relief and requested me to visit her. I did so; found her in bed and suffering severely. A careful examination revealed a cavity in the second lower bicuspid. The opening to it was below the gum, and the pulp was exposed. An application of carbolic acid gave almost instant relief; the neuralgia disappeared, and never returned up to the time of her death, which occurred ten years later.

I do not recall any case of importance where there has been pain in the ear. It is a very common occurrence, however, for children to complain of earache in connection with decayed teeth, and the treatment of the decayed tooth stops the earache; that is, when the teeth are properly treated the earache stops. I think that if the paper should be read before a body of physicians it would be of great value, perhaps, in calling their attention to the reflex effects of defective teeth.

Dr. PERRY. I like this paper very much; partly because the gentleman began by calling us odontologists, which I think is a very

strong, proper, adequate word, and which I think will some time be applied to us, when we shall be received into the company of our elder brothers in medicine as specialists. It has brought before us in an authoritative manner what we have known for a long while from our own observation and experience,—the close connection between the teeth and the ears,—and we are glad to have it before us at this time because many of us have felt it, although we have not always, perhaps, been quite sure of it. It must be remembered that cases of earache do not come to us directly; they go first to the physician, and we do not see them directly, sometimes not at all. Therefore dentists, or odontologists, do not have the opportunity of seeing those cases and watching them so closely as they otherwise would. I have seen quite a number of them, and some of the cases were so marked that there could be no question about the connection between the teeth and the trouble in the ear. One might almost assume that such would be the case, because we know perfectly well that carious teeth in the upper jaw will cause pain in the lower, and the reverse; and it is sometimes surprising to see how persistently the patient will insist it is in the lower jaw when it is in the upper, or that it is in the upper when it is in the lower. To touch the carious tooth will sometimes cause the patient for the first time to feel the pain in that tooth. The nerves of the upper and lower teeth are intimately connected, but so also are they intimately connected with the nerves of the ear, and it would not be too much of an assumption to say that there should be just such trouble as has been described, and it is analogous to having the pain in the upper jaw when the carious tooth is in the lower. I never take much account of what patients tell me as to where the pain is. I look for myself, and I can generally find, without any direction on their part, where the trouble is. I suppose others have had the same experience.

Dr. J. F. P. HODSON. I was reminded of a case, just finished, that quite bears on this subject and is very applicable. One of my old patients, a man who has been living abroad for some time, came under my hands for usual treatment. Before he came to me he had been in the hands of an aurist, suffering greatly for some time and not having the slightest idea that there was any connection between the pain in his ear and the teeth. I found on general examination and inquiry in connection with his ear that it was always on one side that he had the pain, never jumping to the other side; and I suspected his teeth and made a very careful examination. In a posterior approximal filling in a lower molar, where the stopping ran far below the edge of the gum, I found an opening below leading practically into the posterior root-canal, and, knowing that that tooth had never been treated as a pulpless tooth, on general principles I opened it. I took out all the filling and found that there was no opening into the posterior root-canal. It was perfectly closed. There was no opening in what had previously been the canal, but the pulp in the anterior root was inflamed, and when I reached it and made an application to it he said, "Dr. Hodson, you have gotten hold of my ear finally." I was very delighted to have done so, and it did cure all his ear trouble.

Dr. BREWSTER. It occurs to me that a case I had in the past week bears somewhat on this subject. All of the cases that have been given here as the experience of the gentlemen have been reflex action caused by diseased teeth, the pain being located in some other portion of the head or body. This case of which I speak was of an opposite character. In that case the patient came to me for disturbance in her lower teeth, on the left side. The gums were considerably swollen and inflamed, but after treatment for four or five days they seemed to be perfectly healthy. Still the pain in the head, which the patient said she thought came from the teeth, increased. Each day on coming to my office she said that the pain had been worse the night before, and she did not get to sleep until nearly morning. I therefore came to the conclusion that there was some other cause than the teeth; in other words, that the condition was systemic. I referred her to her physician. He told me over the telephone that he was busy and could not attend to it, and told me to go ahead and do what I thought was best. I do not like ordinarily to trespass on the field of the physician, but in this case I prescribed the following:

R—Caffein citrate,	12 grains;
Salol,	
Phenacetin,	āā 1 dram.
Misce et ft. chart. no. xii.	

Sig.—One every three hours.

She took two powders during the night, and the next day she said she was considerably better. After the second day she said she had no further neuralgic pains.

This is my experience,—that the teeth are not always the cause; there may be some *other*, which if rectified will make the teeth right.

Dr. AGEBEY, of Athens, Greece. One day I was making some teeth for an eminent doctor of Athens, Dr. Aritel. He is a physician from Berlin. He told me that he had a patient who for three or four years had been troubled with her ear. I asked, "Who is she?" and he told me it was a young lady of one of the best families in Athens. She was a beautiful girl of twenty-five or twenty-six years. I said, "Have you ever looked in the mouth of the girl to see if anything was wrong?" He said, "Yes; I have looked over and over again, and there is nothing wrong there." The next day he brought the young lady to my office, and I examined the mouth. Her mouth was in very good order, but when I saw the left wisdom-tooth I said to the doctor, "That tooth is the cause of the earache." "Well," he said, "if you are sure we will extract it." We chloroformed the young lady and succeeded, after ten or fifteen minutes, in getting it out. She was well in seven days, and never complained again of her ear.

Another case was of a young married lady who came from Trieste to Greece. She came to see a good oculist we had, Dr. Panna. The right eye was always running with matter. I was working for her sister, who one day said to her, "Have the doctor look at your teeth and see if there is anything the matter with them." I examined them and found the gum was quite inflamed.

She said, "I had a pivot tooth there once, but it is broken, and since then I have had that inflammation in the mouth." I made an examination, and finally pulled out a large pivot through the nostrils. After I had cleaned out the nose with a syringe she went to Dr. Panna. I wrote him a few lines explaining it, and he told her her eyes had nothing to do with the trouble, but it was all from the teeth. In about two weeks the lady was completely cured.

I had a peculiar case lately. Two families went out to picnic in the woods, and they made a swing. A little girl about fourteen was swinging others, and as she stooped the board struck her mouth and knocked her down. I happened to be near, and they called me. One of the teeth was lying on the ground. I picked it up, washed the mouth, and put the tooth in place, tied it with a string which we took from a tassel, and the tooth got well in eighteen or nineteen days.

Dr. PERRY. I would like to ask Dr. Dench if he has observed any greater frequency of trouble arising from the upper or from the lower teeth,—if there is any difference in that respect?

Dr. DENCH. I might say that I never have observed any difference. I have kept no record of the cases, and so I am not able to state; but as far as I remember there has been no difference. The upper and the lower teeth were equally affected. I speak with some feeling on the subject because I occasionally have an earache myself, and I have a large cavity in one of my teeth; by putting my tongue in it I have stopped the earache.

I thank you very much, gentlemen, for the very lengthy discussion you have given this paper, as it seems to me that the paper is entirely unworthy of so much attention.

Adjournment.

W. J. TURNER, M.D., D.D.S.,
Editor New York Odontological Society.

SEVENTH DISTRICT DENTAL SOCIETY OF THE STATE OF NEW YORK.

THE Seventh District Dental Society of the State of New York held its thirty-third annual meeting in the parlors of the Powers Hotel, Rochester, April 9 and 10, 1901.

FIRST DAY—*Morning Session.*

The society was called to order at 10.30 A.M. by Dr. C. H. Nicholson, of Rochester, president. The minutes of the last annual and semi-annual meetings were read and approved.

The report of the recording secretary was received and, on motion, approved.

Dr. F. W. PROSEUS, the corresponding secretary, reported that he had addressed a letter to the deans of all colleges in the United States and to a number of prominent dentists who were interested in educational work, asking whether those addressed thought it would be advisable to adopt a plan which would show where every

dentist following unprofessional methods received his or her diploma. His plan was to publish lists of such dentists, and also those employed in offices conducted in violation of the code of ethics, giving in each case the college from which such dentist graduated. He asked his correspondents whether they thought that such a classification would assist a preceptor to select a college to which he would advise a student to go, and if it would not also stimulate the colleges to make the teaching of dental ethics nearer what it should be.

Of the large numbers of the above letters sent out, he had received replies from Dr. W. C. Barrett, dean of Dental Department Buffalo University; Dr. Faneuil D. Weisse, dean of New York College of Dentistry; Dr. R. Ottolengui, editor *Items of Interest*; Dr. James Truman, editor *International Dental Journal*; Dr. E. C. Kirk, dean of Dental Department University of Pennsylvania.

All of the above expressed doubt as to the usefulness of the plan proposed.

Those whose names follow gave more or less qualified approval: Dr. John S. Marshall, Dr. E. H. Angle, Dr. Thos. Fillebrown, Dr. Frank N. Brown, dean of Illinois School of Dentistry; Dr. John I. Hart, president of Dental Society of the State of New York; Dr. B. C. Nash, secretary First District Dental Society of the State of New York; Dr. H. J. Burkhart, Dr. Jonathan Taft, dean of Dental Department University of Michigan; Dr. F. LeGrand Ames, Dr. Wm. Jarvie, Dr. R. H. Hofheinz, and Dr. A. M. Wright.

Dr. Proseus said his idea was to show which colleges were responsible for the greatest number of unethical practitioners, and he believed the plan would react on the colleges and force them to pay more attention to the teaching of ethics. As far as he knew, only one college in the United States regularly made ethics a part of the prescribed course of instruction.

Dr. FRANK FRENCH, Rochester, said that there was much to be said on both sides of the question, as the letters read had demonstrated, and he offered a motion that it be reported to the meeting of the State Society, and let it be brought before the profession by the State Society.

Dr. W. A. WHITE, Phelps, N. Y., offered an amendment that the corresponding secretary be instructed to continue the work, as he considered it very important, and it was desirable that he should receive as many expressions of opinion from prominent men as possible.

The motion, having been seconded, was put to vote, and passed as amended.

After hearing and disposing of the reports of other standing committees, the society adjourned to meet at 2.30 P.M.

Afternoon Session.

The society was called to order at 2.30 P.M., and the president, Dr. C. H. Nicholson, delivered the annual address.

After reviewing the situation and conditions to be found at present, he pointed out some of the things with which mothers and

children should be made familiar, but of which they were, in the vast majority of cases, sadly ignorant. He declared, "We often hear of children being sent home to wash their hands and face, but did you ever know of a child being sent home to clean his teeth?" They are often "like unto whited sepulchers, which indeed appear beautiful outward, but are within full of dead men's bones and all uncleanness." "But how," he asked, "can all this be remedied? What practical application can we make of this subject? These four suggestions were offered:

First. Let every practitioner continue to be a teacher to his own patients. In that particular field he should have large influence, and could by clinical demonstration illustrate the importance of the truths he teaches.

Second. The Board of Education would be doubtless accessible to a properly accredited committee, and some of our more talented members who are accustomed to lecturing and public speaking would, I have no doubt, be very welcome at conventions of teachers and mothers' meetings in a series of talks on these subjects if the matter could be properly brought about.

Third. How can such teaching be introduced into our public schools? It should be incorporated in text-books on physiology and hygiene, and to accomplish this would be a matter of legislation. If we go to our local board of education or the teachers in our schools, we find they have no authority, and that their time is already taken up with subjects they are obliged to teach. The curriculum is furnished them by the superintendent of education at Albany, and until the necessary authority comes from that source the matter would receive no attention. That, it would seem to me, would be the proper place to begin work on the schools. We send delegates to the State Dental Society, meeting in Albany in May each year, which has a standing committee on legislation. Our delegates should be instructed to introduce the subject at the next meeting of the State Society, with a view to having immediate action taken through the proper channels.

Fourth. A thorough inspection of the teeth of school-children should be made by competent and regularly appointed dental inspectors, who should carefully look over the teeth and provide the child with a chart or diagram showing the needs of the case, which could be taken home to the parents and sent with the child to the family dentist. Duplicates of the chart could be retained if necessary, and a rapid re-examination would tell whether the matter had been attended to.

If parents were fully alive to the importance of proper attention to the children's teeth, perhaps such a plan would not be advisable, but the majority of children's teeth are slighted by parents until by loss of sleep or some other disturbance the question is forced upon their attention. Where city scholars have so few out-of-door privileges and the crowding of studies make such demands on their strength and vitality, why should the proper care of the dental organs, which play so important a part in the general health and development of the child, be neglected?

Here followed some extracts from reports of dental examinations of schools in Germany and Sweden. Continuing, the speaker said:

I realize that these suggestions may be crude, and require careful thought and deliberation to bring them to a practical basis; also that the time has not come perhaps to ask that such appointments be made,—that popular opinion would not sustain it, and the public must become educated up to it. But if the seed herein sown falls on good ground (and in submitting it to this society I am satisfied it does) my object will be attained. “A little leaven leaveneth the whole lump.” I am also aware that many objections will be raised to these suggestions, as they are being raised to the recent proposition to have medical inspectors for the detection of contagious diseases, not only by officials, but by physicians themselves, which I think may be prompted somewhat by jealousy. They don’t want their own children nor those of their patients to fall into the hands of others, especially a public official.

A prominent optician a year or so ago secured a permit to examine at his own expense the eyes of the school-children, giving each child a chart showing defects in his visage, if any; but a storm of opposition arose when it was found that these charts had printed on one corner his own professional card. The plan I have suggested is devoid of such objectionable features. The examining officer should have no axe to grind. There should be no advertising nor politics about it, but information as to the needs of the child would be placed in the hands of the parents, who would have the work performed by their own family dentist. An obstacle to be overcome would be the provision for carrying out the work suggested by the inspector.

Others, especially the laity, may say that we are promoting this thing for selfish motives, to increase practice; that we are buried with legislation never carried out, and burdened with inspectors and salaried officers,—that even the barbers are seeking legal authority to require examinations, appoint officers, and regulate the charges for their services. But I would say that dentistry is in a very different class. Closely allied and akin to the great medical profession, it is equally a learned and liberal profession, with just as stringent preliminary educational requirements, demanding as great a time in preparation for its practice, and granting to its graduates, with the authority of the Board of Regents and the legislature, a diploma as evidence of the competence of the holder to take his place in its ranks. It is therefore dominated by higher motives,—viz, the betterment of man’s condition, rather than the love of gain. And it should be apparent to every thinker that if the suggestions of this paper could be carried to a successful issue the tendency would be ultimately to put the dentist out of business, rather than increase it; for when people have learned the lessons intended to be taught them the services of the dentist will be far less frequently sought than at present.

In conclusion, I would earnestly recommend that before the present session of this society shall be closed steps be taken—

First. To appoint a committee to take up the question with our

Board of Education, and secure their interest and co-operation that when a suitable text-book has been prepared the board will realize the importance of the question, and place the subject in the grades and give the pupils who pass a standing, and in that way teachers and scholars will take a greater interest in the subject, and the benefits will be more lasting and beneficial.

Second. That the secretary be authorized to correspond with the various mothers' clubs in the city, suggesting that if it were desired by them a series of lectures by members of this society might be arranged, and that the incoming officers appoint members who are willing to assume such duty.

Third. That our delegates to the State Society be instructed to bring the matter before that society and secure the action of the Committee on Legislation for the introduction of such matter into the text-books of our schools as a competent committee of the State Society shall prepare and advise.

On motion, the president's address was referred to a committee for action on the recommendations contained therein. The committee named was Drs. Frank French, J. E. Line, and B. G. Saunders. This committee reported as follows:

"The Committee on the President's Annual Address have carefully considered the same, and commend it to the society as containing many points worthy of our consideration. We think that while dental inspectors for the public schools would be a means of producing much good and a method of obtaining a mass of valuable statistical information, the present time would be inappropriate, as the address states, to inaugurate such a movement. Public sentiment at the present time would not sustain the Board of Education, even if they were favorably disposed.

"We heartily indorse the recommendation to have our representative on the Committee on Legislation of the State Society instructed to bring the matter before that committee to secure the subject's proper introduction to the State Society, with the object of having suitable matter prepared and securing its insertion in the text-books authorized by the Department of Education.

"We also approve of the appointment of a committee to take up the matter with our Board of Education, of introducing dental lectures in the next season's programs of the mothers' clubs in the city, with the idea of having such lectures, if desired, given by members of this society. While this method of procedure is different from that suggested by the address, we think it more likely to be successful, and at the same time will accomplish the same purpose.

"The committee would further recommend that this report be embodied in the report of the secretary of this society to the State Society, in order that it may have official recognition.

(Signed) "J. EDWARD LINE,
"B. G. SAUNDERS,
"FRANK FRENCH."

Dr. G. F. SHOWERS, of Covington, then read the following paper:

PRACTICAL POINTS IN PROSTHESIS.

In constructing artificial dentures, the first consideration is the character and condition of the mouth,—whether any teeth remain, their position, etc.; the shape of the arch; whether the mouth is uniformly hard, or hard in one place and soft in another,—as on these conditions depend the treatment of the impression and the selection of an impression material.

For a full plate, nothing equals plaster as an impression material. If it is desirable to have a model exactly representing the parts in their normal position, use thinly mixed plaster; if it is desirable to compress the soft parts, use a heavier mix and wait until it has begun to set.

To prevent plaster from dropping back into the throat, place a rim of soft wax across the back part of the impression tray and place it in position, fitting the wax accurately to the palate. When the tray is placed in the mouth with the plaster in it, this wax rim effectually prevents the plaster from overflowing. This ridge of wax compresses the tissues slightly and makes a snug fit at that point, while without it the plaster has a tendency to drop away, and the plate will not fit closely unless a considerable portion is scraped from the model.

Plaster impressions sometimes adhere very tenaciously to the mucous membrane. To avoid this, mix with the impression plaster a quantity of marble-dust or pumice,—one part pumice to two parts plaster. This also facilitates separating the model from the impression, as the impression is much softer and easier to break, thus reducing the danger of breaking the model.

The bite is preferably taken on the gutta-percha base-plates, using in this operation the Snow "face bow," which will be found of great assistance in producing the perfect set of teeth, as with it we are enabled to place the bite on the models and fasten them to the Gritman articulator in the same relation as they were in the mouth. We know that the distance from the condyle to the center of the jaw where the incisor teeth will be placed is about four inches, which we might measure when placing the bite in the articulator; but the "face bow" measures it for us, and prevents displacement of the models laterally.

I would like to suggest an improvement for the face bow, or rather that part of the apparatus which is placed in the mouth. Instead of having the surfaces which are placed between the upper and lower trial plates smooth, have two short posts on each side; these, when the jaws are closed, will imbed themselves in the wax. The bite may be taken with this part in position, then the bow adjusted. The bow with the mouth-piece attached is then removed (as it is unnecessary to fasten the trial plates together), the posts having marked the wax so they may readily be placed in the correct position and fastened together before placing them on the articulator. I have found this plan much more convenient than attempting to remove the face bow with the base-plates attached, and besides being much easier it is more accurate, as we avoid the danger of changing the relative position of the trial plates, which is apt to occur when they are removed with the face bow.

The Gritman articulator is so modeled as to enable us to get all the movements of the jaw as it is used in masticating, while with the old-style hinge articulator but one movement is possible. It is impossible to properly articulate a set of teeth on one of the old style, as the teeth will be correct in but one position. With the lateral and forward movements possible with the Gritman, we can arrange the teeth so that they will be correct in any position in which the jaw is used.

The correct overbite is very easily determined if we bear in mind what Dr. Bonwill has written on this subject. "The overbite of the incisors is equal to the length of the cusps of the bicuspid," and after we have the case in the articulator we may see at a glance how far the upper incisors should overlap the lower. It is my practice to try the teeth in the mouth after they are ground up, to make sure that no mistakes have been made.

The next important consideration is how to avoid dark joints. I follow the time-honored method of working thinly-mixed oxyphosphate cement between the joints and measuring the wax base-plate in a glass partly filled with water, substituting rubber for wax to get the correct amount of rubber, thus avoiding excessive pressure in closing the flask and the danger of forcing the blocks apart.

It is excellent practice to cover the model with tin foil before packing the rubber, thus securing a smooth palatal surface, which adds much to the comfort of the patient and to the ease with which the plate may be kept clean. The tin may be removed after vulcanization by immersing the plate in muriatic acid.

Before packing, be sure to scrape away the posterior portion of the model to the depth of about one-thirty-second of an inch. This gives sufficient thickness of rubber to finish up with a well-rounded edge, which will not cut into the tissues.

The most troublesome class of plates to make satisfactory are those partial cases where no teeth posterior to the canines or first bicuspid remain. Lower plates of this class are more difficult than the upper. For these troublesome cases I wish to recommend the Condit system of attachment. This method requires crowning of the canines or bicuspid, and to the distal approximal surfaces of the crowns is soldered a short, heavy tube. A split tube with a spur to extend into the rubber. This split tube has a post soldered in the grinding-surface end, and extending the length of the tube. The split tube fits outside the tube on the crown and the pivot inside, forming a very strong method of attachment. Care must be taken to have the tubes parallel, that the plate may be readily placed in position. This method is superior to clasps in every way, but is more expensive. A trial will convince both operator and patient of its usefulness.

On metal plates, a rim around the edge adds to the stiffness of the plate; makes a much nicer finish, and aids materially in holding the rubber. An easy way to make this rim is to swage it as a part of the plate, and for aluminum plates the only way. The plan I have adopted is as follows: Bevel the impression around the upper edge, the bevel sloping toward the outer edge all the way around.

Be sure to trim off enough so that the plate will not extend too high. This forms a shoulder around the outer part of the model, against which the plate is swaged, which turns the upper edge of the plate, but not quite enough to form the rim. It can be completed with a pair of pliers, with no danger of distorting the plate, as the rim is more than half formed by the swaging. It is impossible for the rubber to separate from the plate if this style of rim is used, and it always separates more or less when no rim is used, affording a place for the lodgment of particles of food.

Discussion.

Dr. J. REQUA, Rochester, said that the subject of the paper was interesting, and the points brought to the notice of the society would be of advantage to many. He did not agree with the author as to the necessity of using plaster hard in getting an impression so as to compress the soft parts of the mouth, as these parts will readily assume the form of the plate in any case.

One of the good points in the paper is its insistence on a good articulator. With the old-style it is only by chance that we can ever get a good articulation, while with the Bonwill, in my practice, or the Gritman recommended in the essay, having all the movements of the jaw, you can work with a sense of security that your plate will not tip up and become loose every time the wearer closes his mouth.

The appearance of artificial sets when in the mouth is of the greatest importance. The saying that it is the height of art to conceal art is true in our business more emphatically possibly than in any other. We should not be content while artificial sets are made so that their artificiality is apparent. To obviate this we must avoid perfection of color, form, and position in the teeth. They should be selected to conform to the age and features of the one who is to wear them.

Dr. LEROY REQUA, Rochester, did not think the use of pumice or marble-dust to render the model removable from the mouth and from the impression was necessary; for this purpose he used a colored sandarac varnish, which was effective and quicker and avoided the chipping of the model.

Dr. J. H. BEEBEE said it was an easy thing for dentists to make their own sandarac varnish. All that was necessary was to dissolve sandarac in alcohol until of the proper consistence, but it was important that while the solution was going on the bottle should not be left at rest, for in this case the sandarac will settle at the bottom and be very difficult to either remove or dissolve.

His practice in taking impressions is first to take it in wax, then enlarge this to give space for the plaster with which the final impression is taken. The wax impression is scored so as to afford a hold for the plaster. Then he places a tablespoonful of plaster in the tray, and, putting a mass of plaster against the roof of the mouth, presses the tray to place, being careful to get it to the posterior part of the mouth first. If this method is followed, there is no fear of a bubble forming in the plaster. To remove the plaster from the mouth, his plan is to have a hole in the impression tray,

through which he inserts a blunt instrument through the plaster to allow the air to get in.

Dr. B. S. HERT spoke of the advantages of the Bonwill articulator, which he considers almost indispensable when a double set of teeth are to be fitted.

The subject was passed, and Dr. W. W. BELCHER, Rochester, read the following paper:

LOOKING FORWARD.

Entering upon the threshold of a new century, in these days of great business trusts and corporations, we find that dentistry is one of a few examples of individualism remaining. It has been affected by the new order of things in a lesser degree than any other profession. The city hospitals and ambulances, the free dispensaries, the specialist and his private hospital, and the advertising quack have all made inroads on the medical profession. In the legal profession the collecting agency, the corporation lawyer, and the dozens of specialists, the big law firm attending to the business of a score of lawyers of the past by the aid of stenographers and a few cheap clerks, make it difficult for the young man entering practice to secure a living. He finds competition so fierce that he opens a real estate agency on the side, starts a divorce mill, or robs a Sunday school to obtain the wherewith to clothe his family in fine linen. Dentistry,—a profession of yesterday, rescued from the hands of the blacksmith, the barber, and the watchmaker, like Dean Swift's poem of the flea, which, if you remember,

"Has smaller fleas that on him prey,
And these have smaller still to bite 'em;
And so proceed ad infinitum."

is being subdivided into specialists of one department. Gold, plastics, oral surgery, orthodontia, crown and bridge, porcelain and plate-work,—all have their specialists, many of them poorly prepared, it must be confessed. A few, like the physician when asked if he made a specialty of the skin, answered, "Yes, and everything inside of it," remain general practitioners; but this is truly the age of the specialist. In the modern business world the "jack of all trades" has had his day, replaced by the man who devotes all his time to that which he can do best; he only survives as a memory. A man employed in a shoe factory may be a laster, a machine operator, or one of the dozens of specialists that work on a shoe; he knows his part, and that only. The training of the foreigner who comes to our shores seeking life, liberty, and the pursuit of happiness has been entirely different. If he becomes dissatisfied he leaves the factory and establishes for himself a little shop for the making and repairing of shoes; but his American *confrère*, a factory specialist, is unable to avail himself of this opportunity. In nearly every industry we find it the same. A young man enters an iron foundry, and from morning to night he molds pump-handles; he can make more pump-handles than is possible to any other workman without a like preparation. The years pass, and he fondly imagines he has mastered a trade. So he has, but it is a

trade of pump-handles, as he will find out when he seeks a position elsewhere.

Is this a benefit to the individual? And yet it is the increasing tendency of all business ventures,—the scientific, the civilized, replacing the crude business systems of our fathers, the system that is conquering the world, making it possible for the American manufacturer to command the markets of the universe. The foreign manufacturer must adopt it, with all its good and its many evils, or retire from business.

This new order of things is only possible under a corporation, with the attending limited liability of each for the acts of others,—the combining of one great industry with a number,—a trust, if you please. Great consolidations mean system; successful combinations mean better goods at lower prices, brought about by scientific supervision. Is dentistry coming to be a corporation, controlled by a superintending head, where business men seeking an investment will place their money? Has any one as yet advertised *good* dentistry, honest services, worked for a reputation, not as an individual, but as a corporation, managed on the lines of the modern department store, jealous of its reputation and business integrity, where honest services and not cheapness were the first consideration?

A great and successful merchant has said, "I want no man in a responsible place who cannot create more business than he can attend to." In the past, if you employed an assistant and he amounted to anything, he would make his departure and start an office of his own when his bank account was in a healthy condition, but the difficulties of obtaining a practice are becoming greater. The young man hesitates to embark his frail craft on the troubled waters, and is content to remain an assistant at a comfortable salary.

Are we coming to the stage where a master mind superintends the efforts of a score of trained operators, each a specialist? We know and do not fear the modern advertising parlors, with its many signs, display of teeth, cheap fees, and inferior services, dear at any price; but what of this? Is such a combination possible? I think so; not only possible, but a probable development of the future in our large cities. The country dentist must necessarily be a general practitioner, ready for every emergency. The new order of things will leave him undisturbed, unless it be that with the advent of the modern trolley system his patients will seek the city specialist for anything out of the ordinary.

But, as Uncle Eben Holden says, "There is such a thing as too much foresight. People get to figuring what might happen year after next, and let the fire go out and catch their death of cold right where they are."

A dental practice is many times the result of a strong personality, rather than great ability. As yet the public do not have any great respect or confidence in the dental profession as a body, but rather a personal confidence in an individual member. They go to their favorite dentist because they believe they are securing better services, less pain, or cleaner dentistry than could be obtained elsewhere, and wonder his competitor is able to make a living.

"No Minerva is born full-armed, no Venus awakes full-grown in a shell of pearl on the seashore." The dental corporation must fight its way and demonstrate that it has an excuse for being. We may stand by with the careless confidence of the last man outside of the ark, who assured Noah of his belief that "it would not be much of a shower, after all." But come it will, though its coming may be long delayed. In dentistry as a body, organization has been developed in the last few years that would have been impossible in the past. Contrast the extortions of the Rubber Company, with a worthless patent, and the successful fight of the Dental Protective Association.

Within the past year the dentists of this city have combined and purchased filling-materials in one hundred-ounce lots at a reduction of nearly one-half. Could not the same be accomplished in the purchasing of all dental materials? Why not have a purchasing association of a dozen or more dentists,—a hundred if you please, each subscriber paying into the general fund, say, fifty dollars; with this as a capital, after ascertaining the needs of the individual members, purchasing teeth and all dental supplies in quantities, furnished by the lowest bidder? The scheme is eminently practical, and only needs a promoting head to become an accomplished fact.

Discussion.

C. F. BOOTH, Canandaigua, spoke of the progress toward combination that is so prominently figuring at this time in all kinds of business, and said that while it had not as yet developed in any way to seriously affect or even threaten the dentists, there was a possibility that in the near future this development might come. There are now rumors of a company preparing to open dental offices in every considerable town, employing specialists to do every kind of dental work, with the expectation of monopolizing the whole business. The plan for dentists to organize so as to buy their supplies at wholesale prices was another step toward combination. Both or either of these may affect us for good or ill, or may not. What we must do to be safe is to couple with the professional ability to earn a living the business methods of practical business men. If we have this business ability we can keep in the van of progress in whatever direction it may go.

On motion the subject was passed.

(To be continued.)

NORTHEASTERN DENTAL ASSOCIATION.

(Continued from page 532.)

FOLLOWING is the discussion which ensued upon the reading of Mr. H. D. Perky's paper, "Nutrition as a Tooth-Builder" (printed at page 467, the DENTAL COSMOS, May issue):

Dr. C. FRANK BLIVEN, Worcester, Mass. From my own experience in the past twenty years in the study of food products and the influence they have upon the teeth, I am convinced of the vital im-

portance of this question to the profession. It is one which every dentist should examine and analyze for himself. The question is, What are to be our ideals in the future? Are we to continue to be simply tinkers,—are we to simply repair the damage which we do not cure? If we are to fulfill our ideals, it seems to me that the dentist of the future must be a teacher,—one who will teach what will save teeth. Do we do it now? If not, are we fulfilling our mission here? These opportunities are constantly before us.

In certain of the states there are laws to prevent the selling of poor food. Congress has been striving to have such laws passed demanding that food shall not be adulterated, and that whatever constituents are put into the same package shall be labeled so that the person who pays for it may know what he is paying for and what he is getting.

What is adulteration of food,—something added or something taken away? If it is the latter, white flour is adulterated food. We have an opportunity here to take up this subject as a profession, and to examine into the food with which the public is supplied. We should see that foods are stamped with the names of their ingredients, and those which are adulterated and unfit for food should be avoided and the sellers brought before the law and punished for their crime,—for I consider adulteration of foods nothing less than a crime. When I undertook the examination of teeth in the study of this subject, I was more than surprised at what I found.

I had previously looked into the matter somewhat when I came in contact with the different nationalities. The race that interested me most, however, was the Hindoo. It has been my pleasure to meet a number of Hindoos in the past few years. These, I have observed, all possess beautiful teeth,—strong, white, and even. I asked them to what they attributed their good teeth, and they said, every one of them, to the grain diet on which they live. You all know that they live principally on fruits and grain. You also know that the Hindoos do not eat meat, and one or two of them said that the particles of meat force themselves between the teeth and rot there and cause decay. That was their way of looking at the matter. Their people had studied this subject for five thousand years, and this was the result. In Calcutta there are only two dentists to-day. They have no occasion for dentists, and, as I understand it, this is their simple argument for a grain diet as tooth-builders. In going among these people, we find them simple in character, diffident, shy, and very obliging, and all of them very good-natured. Their mouths are what a dentist would not call clean, for they do not brush their teeth; they do not believe in it. They simply wipe their mouths and teeth with a cloth, but they all had beautiful teeth and well-developed jaws. It was something wonderful to me. I believe in one day's time I saw more perfect teeth than in thirty years of practice. It speaks something, certainly, for the practice of grain diet. It was my pleasure to examine four Syrian women, one after another, one a mother with two babies with only a year between, and I found in her

mouth a beautiful set of teeth with very little decay. Of the next three women, every one of them had perfect sets of teeth.

Mr. H. D. PERKY, Worcester, Mass. Mr. President, Dr. Bliven has told you that in India they do not have dentists. I imagine any condition of things that would result in no use for dentists in New England would not be a very agreeable surprise. From the present indications, I think there is no immediate danger of their having to abandon the work. I have listened to the subject treated by the gentlemen from your state on Idealism, and saw how it was received. I am very sure that there is not a dentist here but will feel it his duty to prevent further decay of teeth or bad teeth at all, and that it is not only his duty to charge for it, but to prevent decay. I have studied this subject longer than any person in this country. For seven years I have given my attention to the building up of the human body in its normal condition. I have developed to my own satisfaction this rule: You must accept the chemistry of nature in the proportion of food, and pay the penalty in the violation of this order. Any attempt at predigesting, a separation and taking a part of the perfect whole, would be like giving you a limb and asking you to accept that as a man. If you want your children to be well and strong, and to have perfect teeth, it is in your power to do this, for all you need to do is to follow the examples set before you by wild animals, which, by the way, have an instinct to guide them, but the child of a civilized person has not. It is under parental care so long that its tastes are educated, and therefore it is robbed of that privilege which the brute creation has. In examining the teeth of skeletons of animals from all over the world, they will all be found to have perfect teeth, for they all eat naturally organized food.

Dr. BOARDMAN. The next paper is "Training of the Sight and Touch According to Modern Theory," by Mr. CHARLES F. WARNER, of Springfield, Mass.*

Discussion.

Dr. D. M. CLAPP, Boston, Mass. During the early part of the paper I realized that the sooner we recognize the absolute necessity of ascertaining the mechanical qualifications of our students the better off we shall be. I can only say that I fully agree with the paper, and that I believe it will not be very long before we shall require an entrance examination in manual training for the student before entering the dental college, for, although we need education in all lines, we need particularly natural qualifications in the mechanical sense.

Dr. H. W. GILLET, Newport, R. I. The suggestions made are of the utmost importance. I have been interested in what the essayist has said so far as I am able to follow, and it seems to me of great interest to us as professional men. One practical point—at least it seems a practical point to me—is that we appear to be approaching a time when dentists will be expected to be medical men,—when our education will be more strictly medical than it is

*Mr. Warner's paper is printed in full at page 615 of this issue.

to-day. I think many of us feel that with the increase of medical education there is appearing a tendency to drop out of sight one of our well-tried principles,—namely, that insistence on thorough education of the fingers and reasoning powers along just the lines the essayist has spoken of to-night. If with the coming of this demand for wider education on the medical side of our profession we act on this suggestion of Dr. Clapp, that our students be selected only from among the candidates who show mechanical aptitude, it will provide us with suitable material in the future.

Dr. J. H. DALY, Boston, Mass. Just a word in regard to some of the difficulties met with by some of the instructors who have poor material to deal with. Think of a young man having attended a dental school for three years trying to fill the lingual surface of a central incisor by standing back of his patient on a stool, and with two packer points trying to insert gold without the aid of a mouth-mirror. This young man, of course, never got beyond the freshman class. When his father was urged to withdraw his son from the dental school and let his lifework be something to which he was better adapted, he became very angry and sent him to another school, where he was meeting with no better success than at the first one. This same young man gave to me an essay on Michael Angelo which showed study and careful research. His examinations always showed thought and a full understanding of the topic under consideration, but his manipulative ability was sadly wanting.

Dr. D. B. INGALLS, Clinton, Mass. I do not feel that I could say anything that would interest this meeting on this paper. It has started a line of thought that perhaps the twentieth century will make more use of than the past. In connection with this natural adaptability, I should take care that the teacher did her part. Of thirty-five scholars attending her class, how many do you think will ever succeed? I asked this question of a teacher, and she said ten, and that the time of the others was thrown away. We see that everywhere, not only in dentistry, but in everything else. There will come a time when this natural law will be investigated, developed, and made to influence our selection of candidates in dentistry, as well as in other departments.

Mr. CHAS. F. WARNER, Springfield, Mass. I appreciate the compliment you pay me in asking to have the paper published. It is altogether incomplete; it is necessarily so, and I doubt if one could cover so broad a subject in a single paper adequate for the publisher, as suggested. All I hoped to do was to start a little discussion, and to open my mind and lead to thought on this subject, and I think, that being done, the service I have rendered to you is practically finished.

(To be continued.)

NEW ENGLAND ASSOCIATION OF DENTAL EXAMINERS.

A WELL-ATTENDED annual meeting and dinner of the New England Association of Dental Examiners took place April 24, 1901, at

the Algonquin Club-house. Dr. Eugene H. Smith, dean of the Dental Department of Harvard College, and Dr. Harold Williams, dean of Tufts College Dental School, were the guests of the evening. The discussion was on matters of interest in the conduct of state boards and their mutual relations. Among the honorary members present were Dr. L. D. Shepard and Dr. J. Searle Hurlburt, formerly of the Massachusetts Board of Registration; Dr. C. A. Brackett, of Newport, R. I., and Dr. A. B. Miller, of Portland, Maine. The object of the association is to provide a standard of examinations for all of the New England states, so that a dentist moving from one state may practice in another.

The election of officers resulted as follows: Dr. Thomas J. Barrett, of Worcester, Mass., president; Dr. Dana W. Fellows, of Portland, Maine, vice-president; Dr. George L. Parmele, of Hartford, Conn., recorder; Dr. John F. Dowsley, chairman of Executive Committee.

CHICAGO DENTAL SOCIETY.

At the annual meeting of the Chicago Dental Society, Tuesday evening, April 2, 1901, the following officers were elected: A. B. Clark, president; Geo. B. Perry, first vice-president; B. D. Wikoff, second vice-president; Elgin MaWhinney, secretary; C. S. Bigelow, corresponding secretary; E. R. Carpenter, treasurer; H. W. Sale, librarian.

C. S. BIGELOW, *Cor. Sec'y.*

NEW YORK STATE DENTAL SOCIETY.

At the annual meeting of the New York State Dental Society, held at Albany, May 8th and 9th, the following officers were elected for the ensuing year: John I. Hart, New York, president; R. H. Hofheinz, Rochester, vice-president; W. A. White, Phelps, secretary; C. W. Stainton, Buffalo, treasurer; H. D. Hatch, New York, correspondent.

W. A. WHITE, *Sec'y.*

AMERICAN DENTAL SOCIETY OF EUROPE.

At the Easter meeting of the American Dental Society of Europe, held at Cologne, the following officers were elected: Dr. W. E. Royce, Tunbridge Wells, president; Dr. F. Foerster, Berlin, vice-president; Dr. Wm. A. Spring, Dresden, hon. treasurer; Dr. L. J. Mitchell, London, hon. secretary.

The next meeting is to be held in Stockholm, Sweden, in August, 1902.

L. J. MITCHELL, *Hon. Sec'y.*

DENTAL COLLEGE COMMENCEMENTS.

PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

THE forty-fifth annual commencement exercises of the Pennsylvania College of Dental Surgery were held in the Academy of Music, Philadelphia, Wednesday evening, May 1, 1901.

The address to the graduates was delivered by Professor Geo. W. Warren, D.D.S.

The number of matriculates for the session was two hundred and ninety-eight.

The degree of D.D.S. was conferred upon the following graduates by the president of the college, I. Minis Hays, M.D.:

John C. Aber.....	Pennsylvania.	Harry C. Krieger.....	Pennsylvania.
Herbert H. Baker.....	Pennsylvania.	Naum Kaschedin.....	Russia.
Emile Barella.....	Switzerland.	Jos. Lautenburg.....	Russia.
Norman L. Bedle.....	New Jersey.	Raul S. Lavayan.....	Ecuador.
John A. Beiser.....	Pennsylvania.	W. Clyde McCurdy....	Pennsylvania.
Frank H. Bellof.....	New York.	Albert B. McMullin....	Pennsylvania.
Geo. W. Bonneville....	Massachusetts.	Patrick Mahoney.....	Vermont.
Thos. W. Caldwell....	Canada.	Mathilde Mayberg....	Germany.
Wm. J. Clifford.....	Massachusetts.	Edmund W. Mayo.....	Massachusetts.
Samuel E. Conley.....	Pennsylvania.	Rose Medally.....	Pennsylvania.
P. Fenton Cooke.....	Pennsylvania.	Kathe Mehl.....	Germany.
Robert M. Cox.....	Pennsylvania.	D. H. Moenck, Jr.....	Cuba.
Chas. P. Crowley.....	Massachusetts.	Albert E. Moss.....	New York.
William L. Davies.....	Pennsylvania.	Benigno F. C. Meza....	Brazil.
L. Domer Davis.....	Pennsylvania.	Burt Ogburn.....	California.
C. C. Dougherty.....	Pennsylvania.	Jorge Otero.....	Cuba.
Ernest H. Duncan....	Canada.	Jose Manuel Otero....	Cuba.
Howard B. Eckroth....	Pennsylvania.	Robert B. Palmer.....	New York.
Jonette Ellingsen....	Norway.	Juan Luis Pedro.....	Cuba.
Adolph Engel.....	Pennsylvania.	Harry O. Pollock.....	Pennsylvania.
Andr�s C. Franceschi..	Porto Rico.	Roy N. Porter.....	New York.
Pedro A. Franceschi....	Porto Rico.	Winfield W. Powell....	New York.
John F. Galvin.....	New York.	Harold A. Raisley....	Pennsylvania.
Robert W. Gick.....	New Jersey.	H. S. Robinson.....	New York.
A. Franklin Goddard..	Massachusetts.	Nina E. Rosenzweig....	Russia.
Francis T. Grennan....	Vermont.	Samuel Rosenzweig....	Austria.
Michael J. Gundler....	Bavaria.	John H. Simpson.....	Canada.
Antonio Guzman hijo..	San Domingo.	Samuel B. Segrest....	Pennsylvania.
Howard D. Haig.....	Pennsylvania.	E. Richard Smith.....	New York.
Henry M. Harris.....	Massachusetts.	Frederick Stauber....	Switzerland.
Arthur H. Haynen.....	Canada.	William T. Stewart....	Pennsylvania.
Carl S. Henry.....	Pennsylvania.	Leopold Stiefel.....	Indiana.
E. Freas Hess.....	Pennsylvania.	Frederick C. Stork....	New Jersey.
Clarence E. Hobbes....	Pennsylvania.	Robert A. Taylor.....	Pennsylvania.
Charles F. Hunter.....	New Jersey.	Arthur J. Theaman....	New York.
William E. Hauk.....	Pennsylvania.	Eugene Totten.....	Pennsylvania.
Roy E. Jones.....	New York.	Jas. B. Tweedle, Jr....	Pennsylvania.
J. Franklin Jackson....	Vermont.	Fred. J. Urban.....	Pennsylvania.
Alma F. Kalthoff.....	Pennsylvania.	Wm. E. Vallerchamp..	Pennsylvania.
Ross H. Keith.....	Canada.	Van B. Walker.....	New Jersey.
Fred. V. Kelchner....	Pennsylvania.	Louis G. Weber.....	France.
Charles L. Kellogg....	Massachusetts.	Clarence L. Wright....	Pennsylvania.
Albert M. Keyser.....	Pennsylvania.	Clarence Wright.....	Pennsylvania.
Paul Kraft.....	Germany.	William Wyckoff.....	New Jersey.
Edw. A. Kretschman....	Pennsylvania.	James B. Zeller.....	Pennsylvania.

BALTIMORE COLLEGE OF DENTAL SURGERY.

THE sixty-first annual commencement exercises of the Baltimore College of Dental Surgery were held in the Academy of Music, Baltimore, Md., on Tuesday, April 30, 1901.

The annual oration was delivered by Rev. Don S. Colt, D.D., and the valedictory by D. L. Reynolds, D.D.S.

The number of matriculates for the session was two hundred and thirty-six.

The degree of D.D.S. was conferred on the following graduates by M. W. Foster, M.D., D.D.S., dean:

J. A. Allen.....	Alabama.	J. H. Lakin.....	Alabama.
A. Aronheim.....	Virginia.	H. V. Levonian...	Armenia.
F. J. Bailey.....	Massachusetts.	F. S. Lodge.....	Canada.
J. H. Beals.....	Indiana.	J. G. Logan.....	Pennsylvania.
R. B. Berry.....	Maryland.	C. L. Meineking..	Germany.
L. B. Breining.....	New York.	M. J. Mitchell....	Massachusetts.
B. W. Brown.....	North Carolina.	J. B. McCreary...	South Carolina.
H. E. Brown.....	Maryland.	J. J. McGarth....	New York.
E. R. Brush.....	Florida.	W. G. McGlumphy..	West Virginia.
B. B. Burleson....	Texas.	S. B. McGregor....	Nova Scotia.
W. C. Chapman....	Connecticut.	E. G. McLean....	New Brunswick.
J. P. Clark.....	Texas.	A. T. Ortezt.....	Porto Rico.
J. D. Croom.....	North Carolina.	M. Otterback....	Dist. of Columbia.
W. L. Davidson....	Pennsylvania.	J. L. Patterson...	Kentucky.
W. T. Davis.....	Kentucky.	J. L. Paul.....	Pennsylvania.
C. E. Dellinger....	Maryland.	E. R. Payzant....	New York.
B. A. Denton.....	Virginia.	C. M. Peabody....	New Jersey.
F. W. Diebert.....	Virginia.	B. R. Powel.....	Maryland.
J. A. Donnelly.....	Massachusetts.	D. L. Reynolds....	California.
J. D. Duke.....	Maryland.	G. E. Robarge....	New York.
E. M. Edmondson...	Tennessee.	W. J. Roberts....	Canada.
R. E. Edwards.....	Maryland.	L. Rosenthal....	Austria.
E. Ehringhaus....	North Carolina.	J. H. Schlinkmann,	West Virginia.
D. A. Evans.....	Pennsylvania.	W. W. Sinks.....	Texas.
L. B. Evans.....	West Virginia.	R. W. Simon.....	Maryland.
A. S. Freeman.....	New Jersey.	S. D. Smith.....	North Carolina.
H. A. Gaylord.....	California.	T. J. Smith.....	Texas.
E. P. Graves.....	Massachusetts.	T. P. Smith.....	Newfoundland.
W. D. Haggerty....	New Jersey.	J. F. Snyder.....	Pennsylvania.
G. S. Handy.....	Mississippi.	H. Stoner.....	Pennsylvania.
W. H. Hamilton....	Virginia.	J. H. Stuart.....	Maryland.
W. K. Hartsell....	North Carolina.	E. B. Taylor.....	Maine.
J. Higgins.....	New Jersey.	A. M. Vannatta...	New Jersey.
E. D. Hood.....	Mississippi.	C. C. Walker.....	Pennsylvania.
L. M. Humphrey....	North Carolina.	C. L. Watson.....	Texas.
C. T. Hutchins....	Maryland.	G. V. Welker.....	Pennsylvania.
R. B. Irwin.....	New York.	J. Wilson.....	Maryland.
W. V. Jarrett.....	Pennsylvania.	M. M. Woodward..	Pennsylvania.
J. M. Kinnear.....	Virginia.	H. P. Wright.....	Canada.
L. A. Ladd.....	Vermont.		

LINCOLN DENTAL COLLEGE.

THE first annual commencement exercises of the Lincoln Dental College were held in the lecture-room of the college, Wednesday evening, April 17, 1901.

The number of matriculates for the session was twenty-six.

The doctorate address was delivered by the Rev. W. H. Manns.

The chancellor of the college, W. P. Aylsworth, conferred the degree of D.D.S. upon the only member of the senior class: Kushi Kumamoto, of Japan.

MEHARRY MEDICAL COLLEGE, DENTAL DEPARTMENT.

THE fifteenth annual commencement exercises of the Dental Department of the Meharry Medical College were held in Nashville, Tenn., February 27, 1901.

The number of matriculates for the session was twenty-seven.

The degree of D.D.S. was conferred on the following graduates by G. W. Hubbard, M.D., dean of Walden University:

G. K. Adams, A.M.	South Carolina.	R. J. Meaddough.	Florida.
J. C. Clark.	Tennessee.	R. H. Voorhees.	Tennessee.
C. T. Chapman.	Illinois.	H. M. Whitby.	Texas.

OHIO MEDICAL UNIVERSITY, DENTAL DEPARTMENT.

THE ninth annual commencement exercises of the Dental Department of the Ohio University were held in the Great Southern Theater, April 16, 1901.

Joseph Medbery, A.M., M.D., addressed the class on behalf of the faculties.

Hon. Fred. J. Heer, president of the board of trustees, conferred the degree of D.D.S. on the following graduates:

Seymour E. Allen.	Ohio.	Wheeler S. Murray.	Ohio.
Clinton J. Altmaier.	Ohio.	Albert Newman.	Ohio.
Wm. E. Arnold.	Ohio.	Herman J. Nicol.	Ohio.
Lee A. Bryan.	Ohio.	William J. Ogg.	Ohio.
Willard J. Burke.	Ohio.	John G. Peterson.	Ohio.
Geo. H. Caldwell.	Ohio.	Wm. G. Ralston.	Pennsylvania.
Burt E. Coe.	Ohio.	Frank C. Reisling.	Ohio.
Walter H. Coleman.	Ohio.	Russell R. Rhodes.	Ohio.
Edward H. Collis.	Ohio.	Mervin M. Rubright.	Ohio.
John A. Consaul.	Canada.	Harley H. Schiller.	Ohio.
Harvey B. Corl.	Ohio.	Ralph W. Schutt.	Ohio.
Leo Corzilius.	Ohio.	L. V. Sherman, Jr.	New York.
Harry E. Craddock.	Michigan.	Clinton L. Simkins.	Ohio.
John D. Doty.	Ohio.	Edward L. Smith.	Ohio.
Wm. C. Feltman.	Ohio.	Clarence E. Smith.	Massachusetts.
Forster C. Franks.	Ohio.	Clyde C. Sherwood.	Ohio.
Thos. A. Hanlen.	Ohio.	Chas. H. Sherman.	Ohio.
Griffith L. Jenkins.	Ohio.	Claude C. Spangler.	Ohio.
Edw. T. Johnson.	Ohio.	John F. Steele.	Ohio.
Wm. B. Kiger.	Ohio.	M. H. Stewart, A.B.	Ohio.
Alfred L. Lambert.	Ohio.	John H. Stukey.	Ohio.
Wm. D. Lavelly.	Ohio.	Wm. E. Taylor.	Ohio.
Harry E. McCleery.	Ohio.	Alvah P. Trubey.	Ohio.
Geo. W. McCauslen.	Ohio.	Elmer E. Warner.	Ohio.
Geo. T. McDonald.	North Dakota.	Evan J. Williams.	Ohio.
Guy M. McDonald.	Ohio.	Arthur Worthington.	Ohio.
Maurice S. Matthias.	Ohio.	William Wing, Ph.G.	California.
Charles R. Mauck.	Ohio.	John B. Young.	Ohio.
Clyde R. Modie.	Ohio.		

KEOKUK DENTAL COLLEGE.

THE annual commencement exercises of the Keokuk Dental College (Dental Department of the Keokuk Medical College) were held in Keokuk Opera House, Tuesday evening, April 9, 1901.

The doctorate address was delivered by Prof. Horace M. Thomson, D.D.S., and the valedictory by Carl Ferdinand Culmsee, D.D.S.

The degree of D.D.S. was conferred on the following graduates by Prof. George F. Jenkins, M.D., president of the college:

Erie J. Ackley.....	Iowa.	Jas. N. Damron.....	Missouri.
Arthur H. Bowles.....	Iowa.	Jno. E. Gardner.....	Iowa.
Carl F. Culmsee.....	Iowa.	Arthur P. Keith.....	Iowa.
Jas. A. Cochrane.....	Missouri.	Jas. M. Kennedy.....	Iowa.
Geo. E. Cameron.....	Iowa.	Lester D. Mitchell.....	Kansas.
Benj. C. Dunn.....	Washington.		

MISSOURI DENTAL COLLEGE.

THE annual commencement exercises of the Missouri Dental College were held in Memorial Hall, St. Louis, April 25, 1901.

The number of matriculates for the session was seventy-eight.

Chancellor W. S. Chaplin, of Washington University, conferred the degree of D.D.S. on the following graduates:

Chas. F. Behrens.....	Illinois.	Harry W. McInerney.....	Kansas.
John H. Brown.....	Missouri.	Joseph S. Miller.....	Missouri.
L. V. M. Crane.....	Missouri.	Joel E. Myers.....	Illinois.
Frank B. Damron.....	Illinois.	Hugh S. Nations.....	Illinois.
Thos. G. Donnell.....	Illinois.	Francis E. O'Connell.....	California.
Howard H. Eaton.....	Illinois.	Jesse A. Pierce.....	Illinois.
Arthur M. Ellis.....	Missouri.	Otho B. Powell.....	Kentucky.
Edw. J. Fischer.....	Missouri.	Owen Sellinger.....	Missouri.
Stephen J. Goodrich.....	Missouri.	Arthur L. Shellhorn.....	Nebraska.
Edward Griffin.....	Missouri.	William J. Sone.....	Missouri.
Henry A. Hamm.....	Missouri.	Anthony P. Stamm.....	Missouri.
Hubert L. Heitman.....	California.	Paul W. Staudinger.....	Missouri.
Fred. W. Heitman.....	California.	Edw. A. Strode.....	Missouri.
Edw. E. Haverstick.....	Missouri.	E. A. Stubblefield.....	Arkansas.
Frank C. Hopkins.....	Illinois.	Emil W. Terhellen.....	Missouri.
Carroll B. Hutchason.....	Missouri.	Wm. G. B. Terrell.....	Illinois.
Louis D. Jones.....	Missouri.	Arnold O. Thilenius.....	Missouri.
Alpheus C. King.....	Illinois.	Jos. M. Van Buskirk.....	Iowa.
Bernard L. Kuper.....	Missouri.	Earl Wannamaker.....	Missouri.
Robt. A. McCall.....	Illinois.	G. H. M. Westhoff.....	Missouri.
Carl S. McCalman.....	Iowa.	Jesse D. White.....	Illinois.
Alex. W. McClean.....	Missouri.	H. T. Williamson.....	Texas.
Mark L. McDanel.....	Illinois.	Wm. B. Young.....	Illinois.
Ralph L. McHenry.....	Missouri.		

KANSAS CITY DENTAL COLLEGE.

THE nineteenth annual commencement exercises of the Kansas City Dental College were held in the Coates House, Kansas City, Mo., Monday, April 29, 1901.

The number of matriculates for the session was one hundred and fourteen.

The degree of D.D.S. was conferred on the following graduates by Dr. A. H. Thompson, president of the college:

E. Anderson.....	Kansas.	L. M. Kallenbach.....	Missouri.
J. M. Anderson.....	Missouri.	Jno. L. Kirby.....	Missouri.
A. J. Batty.....	Nebraska.	J. Albert Kleiser.....	California.
Earl R. Batty.....	Nebraska.	A. Philip Laskey.....	Missouri.
W. Hume Brown.....	Missouri.	Y. E. Masterson.....	Missouri.
C. Chas. Clark.....	Missouri.	P. H. Menken.....	California.
F. S. Davis.....	Nebraska.	W. E. Merrihew.....	Missouri.
J. Victor Dickey.....	Kansas.	W. O. Packer.....	Kansas.
Geo. R. Freeman.....	South Dakota.	H. C. Peters.....	Kansas.
C. L. Gailey.....	Kansas.	Geo. T. Short.....	Kansas.
H. A. Glasscock.....	California.	Lea Trowbridge.....	Missouri.
J. V. Hackett.....	Iowa.	J. S. Vaniman.....	Kansas.
M. F. Hardy.....	Missouri.	Chas. F. Wherritt.....	Missouri.
Robt. A. Hocker.....	Wyoming.	J. W. White.....	Kansas.
W. G. Hopfer.....	Nebraska.	E. J. Wilson.....	Kansas.
Jno. C. Howard.....	Missouri.	Bert L. Winslow.....	Wyoming.
B. R. Hull.....	Kansas.		

INDIANA DENTAL COLLEGE.

THE twenty-second annual commencement exercises of the Indiana Dental College, Department of Dental Surgery, University of Indianapolis, were held in the English Opera House, Indianapolis, Ind., April 30, 1901.

The degree of D.D.S. was conferred by John M. Hurty, M.D., Phar.D., president of the board of trustees, on the following graduates:

E. P. Ames.	W. C. Elder.	C. C. Leak.	John Sergis.
W. L. Anderson.	J. M. Evey.	R. C. Leslie.	C. E. Simmons.
C. H. Bare.	John Farley.	W. J. Long.	B. S. Slater.
F. C. Bailey.	A. E. Fenske.	T. E. McGraw.	S. R. Smead.
C. L. Baird.	W. J. Fritts.	Eugene Magarity.	J. S. Souers.
J. J. Barr.	O. E. Greene.	P. W. Miller.	A. T. Spears.
H. W. Boone.	Sidney Green.	F. C. Moore.	Albert Stanley.
F. G. Brush.	Leroy Harter.	J. D. Otis.	B. J. Stembel.
B. M. Bryant.	E. B. Hartman.	Frank Peterson.	J. W. Taylor.
O. D. Cartwright.	O. B. Henderson.	O. L. Peterson.	M. W. Taylor.
P. E. Coffin.	C. L. Hill.	O. B. Phillipy.	H. H. Thacker.
O. E. Coffman.	F. G. Hutton.	A. B. Price.	W. R. Thomas.
C. C. Cohee.	C. C. Jones.	M. H. Pritchard.	Ray Wenrich.
C. W. Compton.	J. D. Keehn.	B. R. Quinn.	Alex. White.
J. W. Cooper.	E. F. Kendall.	L. A. Riley.	R. H. White.
O. W. Curry.	W. E. Kennedy.	F. W. Ruhl.	C. P. Williams.
F. M. Daniel.	E. H. Kimbell.	C. A. Scott.	R. H. Williams.
P. O. Dickey.	Gustav Krumme.	W. I. Seal.	F. G. Wishard.
Orpheus Dicks.	Seimaro Kubota.	C. W. Seay.	G. C. Witt.
J. M. Dwyer.			

UNIVERSITY OF MARYLAND, DENTAL DEPARTMENT.

THE annual commencement exercises of the Dental Department of the University of Maryland were held in the Lyceum Theater, Baltimore, Md., on Tuesday evening, April 30, 1901.

The address to the graduates was delivered by Aristides S. Goldsborough, Esq.

The number of matriculates for the session was two hundred and six.

The degree of D.D.S. was conferred on the following graduates by Bernard Carter, Esq., provost of the university:

Augustus L. Austin.. West Virginia.	John G. Marler.....North Carolina.
Willis E. Allen.....Maryland.	Floyd M. Owen.....New York.
Robt. W. Aiken.....Texas.	George W. Pierce... Georgia.
John H. Bresnahan...Maine.	Clyde M. Parks.....Pennsylvania.
Chas. C. Birdsall.....New York.	John P. Parker.....Nova Scotia.
Albert M. C. BachmanMaryland.	James E. Pickett.... Ohio.
Gilbert M. Bowen.... Canada.	William A. Rea.....Pennsylvania.
Geo. W. Bruckhalter. Georgia.	William C. Ralston..Canada.
Laurence A. Bragg... Virginia.	Albert A. Radcliff... Maryland.
Russell E. Crumrine.. Pennsylvania.	Willie L. Reaves.... South Carolina.
Wm. W. Chisholm... Georgia.	J. S. Rockwell..... Nova Scotia.
Daniel K. Davis.....South Carolina.	J. Bertram Stevens.. Pennsylvania.
H. M. Eckenrode.... Virginia.	Wm. L. Shipman... New York.
James E. Ewing.....Nebraska.	Alexander Stein.... Russia.
Wm. K. Elliott.....Virginia.	Chas. F. Smithson.. North Carolina.
G. J. U. Fischer, Jr... New Jersey.	Harry M. Sheeley... Pennsylvania.
J. L. Getschel.....Maryland.	John L. Spratt.....South Carolina.
Geo. C. Gilbert.....New Jersey.	Carl S. Sloan.....North Carolina.
Albert W. Gilkinson.. Ohio.	Adin W. Taft.....Rhode Island.
Wiley T. F. Hamilton South Carolina.	Edwin B. Tucker... North Carolina.
Harrison B. Hair... South Carolina.	R. W. Thompson, Jr. South Carolina.
Harry C. Hughes.... Maryland.	Cecil L. Tenny.....Washington.
A. Bezola Holland... North Carolina.	William W. Taylor.. North Carolina.
Geo. M. Hawley.....Vermont.	Will L. Van Ormer.. Pennsylvania.
Francis M. Johnson.. North Carolina.	J. F. Van Nostrand.. New York.
J. Brown Keister.... Virginia.	Amos A. Westrater. West Virginia.
Noe J. Lussier.....Rhode Island.	William I. Wingate. New Hampshire.
Edwin A. Law.....Florida.	James F. Watt.....Indiana.
Alex. Montgomery... Alabama.	Henry S. Willey... North Carolina.
J. Wallace Massey... Virginia.	Benj. S. White.....Tennessee.
Harry N. McDivitt... Maryland.	G. R. Williams.....Tennessee.
Jesse S. Myers.....Maryland.	J. Arthur Watson... South Carolina.
J. Edgar Myers.....Maryland.	Howard C. Watson. Maryland.
J. Sheridan McClees. Maryland.	W. Brown Watson... West Virginia.
H. Webb Maddox.... Virginia.	Oliver B. Wright... South Carolina.
Jas. J. McCormick... New York.	

UNIVERSITY OF OMAHA, DENTAL DEPARTMENT.

THE annual commencement exercises of the Dental Department of the University of Omaha were held at the Iler Grand, Omaha, Neb., on Wednesday evening, May 1, 1901.

The address to graduates was delivered by John H. Webster.

The number of matriculates for the session was seventy-seven.

The degree of D.D.S. was conferred on the following graduates by David R. Kerr, Ph.D., D.D., chancellor of the university:

E. L. Bellamy.....Nebraska.	Clyde C. Metzler.....Missouri.
Frank W. Call.....Iowa.	Guy T. Morgan.....Minnesota.
Wm. W. Driver.....Iowa.	N. H. Morrison.....Nebraska.
Geo. R. Gard.....Nebraska.	W. H. Patterson, B. B. E. Iowa.
L. A. Kenner.....Indiana.	Waldo E. Propst.....Nebraska.
Josephine G. King...South Dakota.	Frank B. Schultz.....Nebraska.
Theo. Kroeger.....Nebraska.	L. G. VanSlyke.....Nebraska.
Jno. Meradith.....Nebraska.	E. E. Wilson.....Nebraska.

BALTIMORE MEDICAL COLLEGE, DENTAL DEPARTMENT.

THE sixth annual commencement exercises of the Dental Department of Baltimore Medical College were held in Lehmann's Hall, Baltimore, Md., Monday, May 6, 1901.

The degree of D.D.S. was conferred on the following graduates by Prof. S. K. Merrick, president of the faculty:

Fred. W. Bennett... New York.	Michael C. Jasielum... Pennsylvania.
Judson C. Carpenter... Vermont.	David J. Joynes..... Maryland.
Willis C. Chandler... New Hampshire.	Charles Kling..... Pennsylvania.
Henry A. Cook..... Maryland.	Charles E. Monks... Connecticut.
Francis L. Dooley... Massachusetts.	Edward B. Rich..... Virginia.
Walter W. Flavelle... New Jersey.	Irving P. Sawyer.... Maine.
Eli Foust..... Pennsylvania.	Wm. A. Smith..... Connecticut.
Wm. M. Frost..... Massachusetts.	Austin E. Thayer.... Maryland.
Arthur L. Granger... New York.	Wm. W. Trabue..... Wisconsin.
Fulton W. Ham.... South Carolina.	Chauncey G. Turner.. Maryland.
Francis P. Haynes... Virginia.	

LOUISVILLE COLLEGE OF DENTISTRY.

THE fifteenth annual commencement exercises of the Louisville College of Dentistry, Dental Department of the Central University of Kentucky, were held at Macauley's Theater, Wednesday, May 8, 1901.

The number of matriculates for the session was two hundred and twelve.

The degree of D.D.S. was conferred on the following graduates by L. H. Blanton, D.D., chancellor:

Luke E. Blair..... Minnesota.	John D. Hiller..... Minnesota.
Jesse B. Blessing..... Indiana.	Miss Aimee L. Jones... Kentucky.
H. Gayle Bohannon..... Kentucky.	Henry L. Jones..... Australia.
J. William Boyd..... Kentucky.	Chas. E. Jenks..... Massachusetts.
Southwell Brace..... Minnesota.	Ewell J. Laiche..... Louisiana.
J. Prue Brashear..... Kentucky.	Wm. G. Lockhart.... Kentucky.
Emmett C. Britt..... Missouri.	Earl T. McCarthy.... Wisconsin.
Robt. L. Britt..... Missouri.	Henry D. Moorman... Kentucky.
Robt. K. Brown..... Kentucky.	S. S. Mayfield..... Alabama.
Edw. W. Brown..... Minnesota.	Charles L. Nance.... Mississippi.
Elvis A. Carson..... Kentucky.	Chas. C. Patteson... Kentucky.
Alfred E. Chambers.... Kentucky.	David A. Parrish.... Kentucky.
Guy K. Clark..... Kentucky.	Robert M. Ray..... Kentucky.
Henry C. Connor..... Kentucky.	Roscoe C. Richardson. Kentucky.
Wallace M. Coulson.... Kentucky.	Byron D. Rivers..... Mississippi.
Geo. M. Creighton..... Minnesota.	French V. Smith..... Texas.
Wm. J. Crockett..... Tennessee.	T. Dexter Smith.... Kentucky.
L. Griffith Crume..... Kentucky.	Lawson W. Smith.... Kentucky.
J. Francis Con.bs..... Texas.	Alden I. Spencer.... Florida.
Thos. L. Davis..... Arkansas.	John D. Stevens.... Alabama.
Howard S. Doyle..... Kentucky.	P. Lawrence Stone.... Tennessee.
John Dieterich..... Illinois.	Wm. Taylor..... Kentucky.
John H. Dye..... Ohio.	Geo. H. Thompson... Illinois.
Millard E. Eby..... Nebraska.	Wm. F. Trusty..... Kentucky.
Robt. W. Gaston..... Mississippi.	Francis A. Ulen..... Kentucky.
James Green..... Kentucky.	J. nes D. Wilborn.... Mississippi.
Wm. H. Gregory..... Alabama.	Sidney C. Wilson.... Kentucky.
Wm. B. Hendricks..... Kentucky.	James R. Williams... Kentucky.
Oscar B. Heavrin..... Kentucky.	James W. Wooten... Mississippi.
Wm. H. Hanning..... Indiana.	

CINCINNATI COLLEGE OF DENTAL SURGERY.

THE eighth annual commencement exercises of the Cincinnati College of Dental Surgery were held in the Odeon, Cincinnati, Ohio, Thursday, May 2, 1901.

The valedictory address was delivered by J. W. Rowe, B.A., M.D.

The number of matriculates for the session was eighty-three.

The degree of D.D.S. was conferred by O. W. Martin, A.M., secretary of the board of trustees, on the following graduates:

Robt. S. Crawford.....	Ohio.	Ira Lemley.....	West Virginia.
Jno. E. Cole.....	Indiana.	A. O. Lucas.....	Kentucky.
E. H. Campbell.....	Indiana.	F. E. Minor.....	Ohio.
Wm. H. Carroll.....	Ohio.	M. E. Mooney.....	Ohio.
Fred. Doolittle.....	Wisconsin.	R. R. MacVettie, B.A.,	Wisconsin.
Florence DeShazo.....	Alabama.	H. W. McCloskey....	Ohio.
Clark T. Deer.....	Ohio.	H. C. Meusel.....	Wisconsin.
Jos. W. Eshman.....	Ohio.	A. C. Paffle.....	California.
Dan. L. Fry, M.D.....	Kentucky.	Jos. Stern.....	Canada.
J. N. Garfinkle.....	Ohio.	Ira H. Schoolfield....	Ohio.
Oscar M. Harper.....	Ohio.	F. G. F. Stephens....	Kentucky.
Edgar Humphrey.....	Ohio.	J. S. Stone.....	West Virginia.
Robt. A. Jackson.....	Michigan.	C. M. Spencer.....	Indiana.
Aug. L. Kolbe.....	Ohio.	W. W. Wilder.....	Ohio.
E. A. Keeler.....	Ohio.	W. R. Wolfe.....	Ohio.
C. D. Kruger.....	Ohio.		

MEDICAL COLLEGE OF VIRGINIA, DENTAL DEPARTMENT.

THE annual commencement exercises of the Dental Department of the Medical College of Virginia were held in the Academy of Music, Richmond, Va., Thursday, May 9, 1901.

The number of matriculates for the session was thirty-two.

The degree of D.D.S. was conferred by Dr. Christopher Tompkins, dean, on the following graduates: W. C. Adams, Virginia; E. W. Bowles, Virginia; J. D. McCue, West Virginia; A. B. Sutton, Virginia.

CHICAGO COLLEGE OF DENTAL SURGERY.

THE nineteenth annual commencement exercises of the Chicago College of Dental Surgery (Dental Department of Lake Forest University) were held in Music Hall, Chicago, Ill., Tuesday evening, April 30, 1901.

The doctorate address was delivered by A. M. Skelton, A.M., M.D., and the class valedictory by Clinton Cassius Webb.

The number of matriculates for the session was six hundred and thirty-eight.

The degree of D.D.S. was conferred on the following graduates by Truman W. Brophy, M.D., D.D.S., LL.D., president of the college:

Gustave A. Anderson.	John C. Huecker.	Samuel S. Patterson.
Thos. A. Alexander.	Benj. N. Hughes.	Ira D. Phipps.
James W. Ames.	Tobias H. B. Hocking.	Rudolph A. Pellage.
Dane R. Allen.	Philip H. Hart.	George H. Pace.
Albert E. Auger.	Roderick Houston.	Alexander Pope.
William H. App.	Henry Helot.	Luther H. Phipps.
Lester F. Bryant.	Stanley Heymar.	Wm. S. Potter, Jr.
Claude B. Brownell.	Robert Holt.	Samuel A. Pangburn.
Wilbur P. Buck.	Wm. W. Hussey.	George A. Russell.
Asa D. C. Barnes.	David T. Jones.	Oliver T. Robinson.
Geo. A. Brown.	John A. James.	John M. Risley.
Samuel H. Behringer.	Louis E. Jordan.	Clarence L. Rork.
Orville S. Burnett.	Martin L. Johnson.	Bert S. Russell.
Edmund C. Borley.	Arne K. Jansen.	Alex. A. Richardson, Jr.
Chadz B. Bell.	Corliss H. Jones.	Richard W. Reinhart.
Irving W. Bean.	Sydney J. Knowles.	Matthew J. Reidy.
Charles W. Benson.	Otto J. Kolar.	Sheldon R. Ross.
Geo. R. Bardwell.	Leander King.	Tennyson J. Ricard.
Cecil V. Connole.	Walter S. Kyes.	Charles A. Rhoads.
Andrew Culhane.	George P. Kalk.	Harold R. Roads.
Leonard W. Cleveland.	J. Ambrose Kelley.	Hagbart J. Rice.
Ross E. Chandler.	Garrett P. Kenney.	William K. Ramsey.
Frank E. Collins.	Edward D. Kenward.	Wm. B. Reeve, D.D.S.
Fred. C. Clow.	Warren L. King.	George J. Rehm.
Orville C. Clemens.	John A. Loomans.	Henry A. Roan.
John F. Curran.	John P. Lederle.	Frank R. Swan.
Jacob B. Carey.	Levi G. Lemley.	Herman F. Schleiffarth.
Charles R. Cretors.	Carl A. Lovgren.	John J. Sullivan.
Thomas H. Deacon.	John H. Lee.	James R. Sholl.
Israel Drozdowitz.	Frank S. Locke.	Allan E. Shaver.
Cyprian B. Dèzell.	John R. Leib.	Oscar H. Sorsen.
Charles A. Easterly.	Robert H. Libby.	Louis Schultz.
Henry B. Ebner.	Wendell M. Lemon.	Ervin E. Smith.
Thad. L. Farnsworth.	Everett E. Lane.	Max C. Shuler.
Wm. H. Ferguson.	Harvey C. McMullen.	John A. Schleuter, Jr.
Theodore F. Fox.	William R. McLean.	Arthur F. Switzer.
Frank E. Follett.	John T. M. McCallum.	Guy De V. Schaffner.
Samuel W. Fahrney.	John R. McCoy.	John J. Schultz.
Frank F. Fish.	Rea P. McGee.	Claude A. Sherman.
Carl Fossum.	Thomas G. McGrory.	Kazuo Sato.
Delne M. Field.	Edwin L. McKee.	Victor R. Schiller.
Charles C. Finch.	Harry S. Miles.	Charles S. Tuller.
George A. Gehbe.	Niels Matzen.	Walter E. Tennant.
Willard Graybeal.	Frederick F. Molt.	John H. Taylor.
Joe H. Gleason.	Daniel R. Murray.	William H. Tweedle.
Charles L. George.	James J. Mount.	Garnet M. Trewin.
Thorvald L. Gerner.	Albert W. Marshall.	Gordon Tucker.
Andrew C. Griffith.	Edwin A. Mead.	Albert Tucker.
Karl H. George.	Donald Marion.	Allen LeG. Vaughn.
John F. Gabriel.	John T. Miller.	William A. Winters.
Leonard D. Grant.	John C. Y. Moore.	Adrian L. Wallick.
Horace E. Griffin.	David G. Mahood.	Johnson C. Winters.
Hubert H. Geiger.	Arnold D. A. Mason.	Winfield W. Walker.
Morley S. Gallagher.	Daniel E. Maloney.	Maurice V. Wolfe.
James A. Garland.	Stephen H. Matter.	Charles F. Watt.
Rowland J. Hollenbeck.	William C. Marks.	Elmer H. Weber.
William N. Hixon.	Samuel C. Noble.	Clinton C. Webb.
Andrew T. Hummel.	Paul S. Orth.	Floyd G. Wolcott.
William B. Harris.	William O. Ogle.	Randall S. Williams.
Timothy A. Hardgrove.	James E. Paul.	Harry W. Walker.
Fred. W. Heatlie.	Chas. E. M. Parker.	Charles E. Warner.
Hezekiah Hayes.	Louis C. Proctor.	Leslie B. Young.
Wm. Hausmann, Jr.	Percy T. Perry.	

WESTERN DENTAL COLLEGE.

THE eleventh annual commencement exercises of the Western Dental College were held in the Standard Theater, Kansas City, Mo., on Tuesday evening, April 30, 1901.

The number of matriculates for the session was two hundred and forty.

The annual address was delivered by the Rev. W. F. Richardson.

The degree of D.D.S. was conferred on the following graduates by D. J. McMillen, M.D., D.D.S., dean of the college:

F. B. Allen.....	Missouri.	Chas. F. Jones.....	Missouri.
Ed. G. Antrim.....	Nebraska.	Frank J. Johnson.....	Missouri.
R. G. Bassett.....	Missouri.	J. H. Lay.....	Missouri.
Mrs. D. M. Bolen.....	Germany.	Chas. Lingar.....	Missouri.
E. C. Braniger.....	Missouri.	G. W. Marks.....	Kansas.
A. M. Bradley.....	Nebraska.	C. J. McCormick.....	Missouri.
Chas. A. Browne.....	Missouri.	B. C. McGee.....	Missouri.
W. B. Bush.....	Missouri.	E. E. Mitchell.....	Kansas.
L. E. Cantrell.....	Missouri.	W. H. Nugent.....	Missouri.
N. S. Clothier.....	Kansas.	H. D. Olsen.....	Kansas.
Jno. A. Cotton.....	Missouri.	Bert G. Peirce.....	Missouri.
R. O. Cull.....	Missouri.	H. T. Rand.....	Missouri.
J. H. Detert.....	Missouri.	C. Rhodes.....	Missouri.
W. A. Duckworth.....	Missouri.	V. H. Rimmerman.....	Missouri.
H. C. Eckhardt.....	Texas.	E. G. Rush.....	Missouri.
Theo. D. Fisher.....	Missouri.	W. S. Sample.....	Kansas.
O. P. Grantham.....	Missouri.	W. S. Shoemaker.....	Kansas.
O. E. Griffin.....	Kansas.	J. E. Tait.....	Montana.
E. C. Glass.....	Missouri.	Hugh Tanzey.....	Missouri.
H. H. Gsell.....	Kansas.	G. C. Wallace.....	Missouri.
G. W. Hillis.....	Missouri.	Geo. H. Webber.....	Missouri.
E. L. Hinshaw.....	Missouri.	Geo. Westacott.....	Kansas.
Russell H. Howard.....	Missouri.	H. J. Wertzberger.....	Kansas.
Dessie Hunt.....	Missouri.	E. E. Wheatley.....	Kansas.
O. S. Holliday.....	Texas.	F. X. Zachman.....	Missouri.

UNIVERSITY COLLEGE OF MEDICINE, DENTAL DEPARTMENT.

THE annual commencement exercises of the Dental Department of the University College of Medicine were held in Mozart Academy of Music, Richmond, Va., Thursday morning, May 2, 1901.

The address to the graduating class was delivered by Charles D. McIver, of Greensboro, N. C.

The number of matriculates in the Department of Dentistry was thirty-seven.

The degree of D.D.S. was conferred on the following graduates by Dr. J. Allison Hodges, president of the institution: F. L. Costenbader, Virginia; Wm. Fleming, North Carolina; C. L. Palmer, Virginia; D. G. Wilson, North Carolina.

PHILADELPHIA DENTAL COLLEGE.

THE thirty-eighth annual commencement exercises of the Philadelphia Dental College were held in the Academy of Music, Philadelphia, on Friday evening, May 3, 1901.

The number of matriculates for the session was three hundred and ninety-six.

The address to the graduates was delivered by Prof. S. H. Guilford, D.D.S., Ph.D., dean of the faculty, and the valedictory by John J. Carroll, D.D.S.

The degree of D.D.S. was conferred on the following graduates by ex-Governor Beaver, president of the board of trustees of the college:

Joseph A. Amyot.....	New York.	Ruliff R. Jordan.....	Pennsylvania.
John A. Bauman.....	New York.	Peter J. Kelley.....	New York.
Helen M. Beck.....	New York.	James T. Kennedy....	Massachusetts.
Charles H. Bender....	Kansas.	Guy T. King.....	Texas.
Tor. B. Bergholm....	Sweden.	Arthur L. Koontz....	West Virginia.
Charles A. Biltz.....	Pennsylvania.	Earl R. Kratzer.....	New York.
Fred. E. Bird.....	New Jersey.	Harry E. Latham....	Connecticut.
Thos. J. Birkbeck....	Pennsylvania.	Clifford L. Mara....	Canada.
Francis E. Bond.....	Pennsylvania.	James H. Miller.....	Pennsylvania.
Claude D. Bowles....	New York.	John J. Monahan....	Massachusetts.
Rosario H. Brazier...	Canada.	Russell E. Morgan...	Connecticut.
Jesse H. Brown.....	North Carolina.	John N. Mowry.....	Rhode Island.
Cornelius H. Buckley.	Massachusetts.	James R. MacDonald.	Canada.
Homer R. Burgess....	California.	Robert W. McConnell.	Canada.
John W. Burghard...	Georgia.	John H. McCulloch...	Pennsylvania.
Charles S. Campbell...	Delaware.	Wallace L. McGee....	Vermont.
John J. Carroll.....	Pennsylvania.	James A. McKee.....	New York.
Gonzalo A. Castillejos	Mexico.	G. S. McLaughlin....	New Jersey.
John S. Chubb.....	Pennsylvania.	Harry H. McMullen...	Pennsylvania.
Fred. G. Cleeve.....	Australia.	Melvin A. Neitzel...	Kansas.
Arthur F. Coles.....	Massachusetts.	Carl Nydegger.....	Illinois.
Harry Cook.....	Pennsylvania.	Eugene M. O'Neil...	Maine.
Arthur S. Cooper....	Oregon.	G. A. Ortmann, Jr....	New Jersey.
Joseph L. Corr.....	New York.	Woodin W. Pealer....	Pennsylvania.
Franklin J. Coxey....	Pennsylvania.	Wm. C. Petherbridge.	Maryland.
Frank R. Cross.....	Oregon.	William A. Pierce....	Maryland.
A. W. Cunningham...	Canada.	Lee R. Pittinger....	Pennsylvania.
Frank L. Dayment...	Canada.	Fred. W. Ratcliff....	Canada.
John K. Erganian....	Turkey.	Harry L. Richards...	Maine.
Frank J. Fitz Gibbon.	Massachusetts.	Chas. H. Roberts....	North Carolina.
John B. Fitzpatrick...	Pennsylvania.	Isaac Rosenberg....	Maine.
Owen D. Flanagan...	Connecticut.	Walter C. Schofield..	Pennsylvania.
Claire I. Foote.....	California.	Alphonse L. Senecal..	New York.
Sayles J. B. Frazier...	Pennsylvania.	Harry C. Sharp.....	Pennsylvania.
John G. Fruehan....	Pennsylvania.	Susan M. Skinner....	New York.
George N. Gardner...	Maine.	Fred. A. Slack.....	New Jersey.
William H. Giles....	Pennsylvania.	Joseph J. Smyth.....	Pennsylvania.
William P. Glynn....	Massachusetts.	David B. Sofield....	New Jersey.
William H. S. Gray...	Canada.	K. M. Oskar Solbrig.	Germany.
Charles E. Grim.....	Pennsylvania.	Harrison T. Sterling.	Canada.
Edw. L. Hammond....	Illinois.	Wm. H. Strangways.	Canada.
William H. Harrall...	Rhode Island.	Robert G. Thompson.	Canada.
Frank W. Hendry....	New York.	Wilson E. Thompson.	Connecticut.
Alfred A. Hicks.....	Canada.	Auguste C. Valadier..	France.
Fred. W. Hopkins....	Pennsylvania.	Roy W. Van Wagner.	New York.
Melville G. Hueston...	Canada.	Milton S. Warren....	Connecticut.
Philip Hussa.....	New Jersey.	Frank E. Watkins....	Pennsylvania.
Charles H. Jaco.....	Pennsylvania.	Walter F. Weeks....	New York.
Frank C. Jewett.....	New York.	Thomas E. Welsh....	Pennsylvania.
Joseph J. Johnson...	Pennsylvania.	S. A. G. Wilson.....	Jamaica.
Richard E. Johnson..	Canada.	Edna R. Witbeck.....	New York.

ROYAL COLLEGE OF DENTAL SURGEONS OF ONTARIO.

THE annual commencement exercises of the Royal College of Dental Surgeons of Ontario were held in the Y. W. C. Guild Hall, Toronto, April 26, 1901.

The address to graduates was delivered by Dr. J. B. Willmott, dean.

The number of matriculates for the session was one hundred and forty-seven.

Degrees were conferred by Dr. G. E. Hanna, president of the board of directors, on the following graduates:

K. C. Campbell.	W. P. Harvey.	D. F. McIntosh.	W. J. Norris.
J. S. Chambers.	J. A. Hoggan.	W. S. McKay.	J. L. Palmer.
W. J. Bentley.	E. C. Hoskin.	G. A. McKay.	E. W. Paul.
A. R. Davison.	Arthur Jemison.	A. McKercher.	J. H. Purdy.
R. Percy Feild.	C. W. McBride.	W. H. McLaren.	J. A. Robertson.
M. J. Frezell.	R. T. McDonald.	J. L. McLean.	S. J. Sims.
S. J. Gibson.	J. R. McGregor.	E. A. Mooney.	W. E. Wilson.
Henry Hartman.			

ILLINOIS SCHOOL OF DENTISTRY.

THE annual commencement exercises of the Illinois School of Dentistry were held in Steinway Hall, Chicago, Ill., May 4, 1901.

The number of matriculates for the session was one hundred and eighteen.

The degree of D.D.S. was conferred by Dr. Frank N. Brown, dean of the faculty, upon the following graduates:

P. A. Armstrong.....	Illinois.	A. J. McDowell.....	Canada.
C. M. Brown.....	Texas.	C. M. Paden.....	Indiana.
A. B. Clark.....	Illinois.	Chas. Reardon.....	Iowa.
M. B. Carthell.....	Wisconsin.	Hall H. Ramsey.....	Texas.
R. S. Donaldson.....	Illinois.	A. Rodosy.....	Illinois.
E. M. Fales.....	Illinois.	Edd. Rudd.....	Texas.
Henry Frankel.....	Illinois.	E. O. Smedberg.....	Wisconsin.
O. C. Hassler.....	Iowa.	S. F. Springer.....	Canada.
C. S. Hines.....	Iowa.	Karl Stecher.....	Illinois.
M. P. Hauff.....	Iowa.	Geo. Strass.....	Mississippi.
Geo. B. Hamlin, M.D....	Iowa.	S. S. Swighart.....	Illinois.
Helen Imbriitt.....	Illinois.	Geo W. Taylor.....	Indiana.
W. F. Misher.....	Illinois.	Harrie Watkins.....	Illinois.
C. M. McCauley.....	Texas.	S. Wallenberger.....	Illinois.

NORTHWESTERN UNIVERSITY DENTAL SCHOOL.

THE annual commencement exercises of the Northwestern University Dental School were held at Studebaker Hall, Chicago, Ill., Thursday afternoon, May 2, 1901.

The doctorate address was delivered by Edward C. Kirk, D.D.S., dean of the Department of Dentistry, University of Pennsylvania; the valedictory address by Joseph Francis Lunak, D.D.S.

The degree of D.D.S. was conferred upon the following graduates by Daniel Bonbright, LL.D., acting president of the university:

Charles Ackerman.
 Robert A. Adkins.
 John R. Akers.
 Morley W. Anderson.
 Peter Appel.
 James G. Atterberry.
 John F. Austin.
 John B. Baasen.
 Guy B. Baird.
 Arthur Baldwin.
 James O. Baldwin.
 Robert O. Beadles.
 Frank C. Beebe.
 Louis J. Behm.
 Joseph L. Benson.
 James A. Bevan.
 John A. Bishopp.
 William F. Blair.
 Otto F. Bohman.
 David H. Bowen.
 Duane F. Bradshaw.
 Harry M. Brock.
 Ferdinand V. G. Brown.
 Percy A. Burhans.
 Charles H. Burkhart.
 Josephine Butler.
 Rolla W. Butturff.
 Clyde Cadwell.
 Samuel L. Carr.
 Wesley H. Chapman.
 Thomas Clark.
 John W. Clevenger.
 Algernon B. Coffin.
 Peter B. Cogley.
 Thomas Coleman.
 George M. Collins.
 Winifred Conley.
 Enos E. Copple.
 George B. Corbitt.
 George J. Couvrette.
 Frank L. Cummins.
 Thomas H. Daly.
 Robert K. Davis.
 Ernest W. Day.
 Frank Deitch.
 Edward A. Demling.
 Katharyne A. Doherty.
 Michael A. Donahue.
 Newton W. Emery.
 Wm. C. Ercanbrack.
 George E. Erret.
 Dow M. Fagg.
 Wm. H. Falloon.
 Arthur C. Fawcett.
 George K. Fleming.
 William J. Frank.
 Thomas J. Fritz.
 Alvin R. Gansel.
 Frank M. Garrett.
 Orlando C. Gilbert.
 John M. Gilmore.
 Alfred W. Glass.
 Charles F. Gottfried.
 William W. Gray.
 R. Allen Griffith.

Albert F. Hacker.
 Harry C. Hadfield.
 Ca T. Hansen.
 Arthur J. Hawkes.
 David J. Heisey.
 Buell Henline.
 Herbert E. Hickman.
 Frank B. Hines.
 James J. Hoffer.
 Olive C. Hopwood.
 John W. Horne.
 Louis G. Hotch.
 Aleck D. Howat.
 David J. Hughes.
 Elmore T. Hull.
 Ora D. Ireland.
 Hayes M. Isenberg.
 Oro J. Jarrett.
 James Jensen.
 James P. Johnson.
 Carl L. Jones.
 William H. Jordan.
 Anton R. Kempter.
 Arthur I. Kennedy.
 James M. Kennedy.
 William J. King.
 Arch. M. Kingsbury.
 George G. Knapp.
 Geo. R. F. Koch.
 Charles S. Kramer.
 Walter G. Kremers.
 Abm. S. Kruchevsky.
 George E. Krueger.
 Charles B. Lacy.
 John S. Laidlaw.
 Vernon O. Landon.
 Harry E. Latcham.
 Franc D. Light.
 Nils H. Linderoth.
 Charles O. Lovitt.
 Joseph F. Lunak.
 William H. McCarty.
 Arthur J. McCormack.
 Thomas R. McCoy.
 Thomas B. McCrum.
 John S. McGowan.
 William D. McMaster.
 F. E. McMennamy.
 Kenneth McQuarrie.
 John R. Macdonald.
 George Mack.
 Arthur A. Mahle.
 Lynn D. Mathews.
 Wesley J. Mathieu.
 Philip L. Mathisen.
 Daniel H. Meeks.
 Otto C. Meves.
 Walter F. Meyer.
 Charles S. Miller.
 Frederick Miller.
 Gustave E. Miller.
 Edward L. Milligan.
 Arthur T. Moore.
 Edward C. Moore.
 Louis J. Nelson.
 Melvin R. Nelson.

Herman C. Newton.
 John P. Nielsen.
 Marshall D. Nisbet.
 Reginald C. Northwood.
 Webster H. Nunn.
 Clark Orr.
 Harry W. Oyster.
 Myrtle J. Page.
 Frederick N. Pellett.
 Royal S. Pershing.
 John Petry.
 Herbert Phillips.
 Curtis Brackett Pottle.
 Harry C. Puckett.
 William M. Purcell.
 Ervin C. Read.
 John S. Reece.
 William H. Reid.
 Alonzo C. Render.
 George T. Richards.
 Herman H. Rohwedder.
 Charles F. Rossteuscher.
 Robert J. Ruckman.
 Adolph E. Schneider.
 Leonard J. Schneider.
 A. Clarence Schoch.
 Herman J. Schulze.
 Harry E. Sears.
 Lyman Sexmith.
 Robert E. Shanks.
 William Shay.
 William D. Siebecker.
 Omer F. Sinks.
 Gunnar H. Skogsborg.
 Charles W. Smith.
 Ernest R. Smith.
 Grant H. Smock.
 John G. Spalding.
 Robert A. Stevenson.
 Earl N. Stoffel.
 Hiram C. Stokes.
 Milton W. Strauss.
 George W. Stroeter.
 James T. Sweeney.
 Lemuel E. Taylor.
 William A. Thomas.
 Joseph F. Thompson.
 Joseph Tichy.
 Paul I. Todd.
 Thomas O. Treen.
 George T. Tristram.
 John W. Vogan.
 Mark LeR. Wait.
 Benjamin Waldberg.
 William H. Walsh.
 Frederic H. Waters.
 George W. Wentworth.
 Edward A. Werner.
 Oscar LeR. Whitson.
 John E. Wickham.
 Earl E. Wilson.
 Oscar J. Wisman.
 Morris R. Wolfe.
 Eugene R. Wyatt.
 Merle D. Young.

UNIVERSITY OF TENNESSEE, DENTAL DEPARTMENT.

THE annual commencement exercises of the Dental Department of the University of Tennessee were held in Watkins Hall, Nashville, Tenn., Monday evening, May 6, 1901.

The degree of D.D.S. was conferred upon the following graduates:

W. M. Ader.....	North Carolina.	O. C. Harper.....	Mississippi.
E. E. Brister.....	Mississippi.	J. O. Hamilton.....	Kentucky.
Oscar Brasfield.....	Tennessee.	W. S. Kennedy.....	Louisiana.
C. L. Brittain.....	Tennessee.	B. J. Marshall.....	Mississippi.
N. H. Delap.....	Indiana.	J. L. Moseley.....	Texas.
H. B. Dunn.....	Virginia.	G. C. Sandusky.....	Tennessee.
O. W. Flemming.....	Georgia.	A. Snow.....	Mississippi.
W. G. Flake.....	Mississippi.	W. G. Walker.....	Tennessee.
P. F. Gould.....	Tennessee.	P. A. Williams.....	Tennessee.
J. W. Hicks.....	Tennessee.	H. A. Box.....	Tennessee.

MILWAUKEE MEDICAL COLLEGE, DENTAL DEPARTMENT.

THE annual commencement exercises of the Dental Department of Milwaukee Medical College were held in the Davidson Theater, Milwaukee, Wis., on Wednesday, May 1, 1901.

The number of matriculates for the session was one hundred and ninety-two.

The degree of D.D.S. was conferred upon the following graduates by George V. I. Brown, D.D.S., M.D., C.M., dean:

M. J. Akan.....	Wisconsin.	A. Karstedt.....	Wisconsin.
Matthew F. Adam.....	Wisconsin.	G. J. Keyes.....	Wisconsin.
H. C. Barber.....	Wisconsin.	D. A. Knilians.....	Wisconsin.
O. A. Beil.....	Wisconsin.	R. H. Lowerre.....	Wisconsin.
J. Beibesheimer.....	Minnesota.	C. T. Lewiston.....	Wisconsin.
M. R. Britten.....	Wisconsin.	George Pritchard.....	Wisconsin.
A. G. J. Brown.....	Wisconsin.	E. A. Plathner.....	Wisconsin.
J. J. Bellin.....	Wisconsin.	W. J. Pendergast.....	Wisconsin.
A. M. Brunn.....	Wisconsin.	J. F. Robertson.....	Wisconsin.
R. R. Conroy.....	Wisconsin.	O. A. Ross.....	Wisconsin.
A. Coyle.....	Wisconsin.	D. J. Ryan.....	Wisconsin.
E. Casey.....	Wisconsin.	T. D. Ryan, Jr.....	Wisconsin.
G. H. Dickinson.....	Wisconsin.	W. G. Ramsey.....	Wisconsin.
H. A. Ellis.....	Wisconsin.	L. A. Sherman.....	Wisconsin.
E. A. Flancher.....	Wisconsin.	W. B. Swaney.....	Wisconsin.
W. H. Gorr.....	Wisconsin.	W. C. Sullivan.....	Wisconsin.
F. O. Hansen.....	Wisconsin.	Frank P. Smith.....	Michigan.
A. A. Hilker.....	Wisconsin.	A. O. H. Strauss.....	Wisconsin.
R. J. Healy.....	Wisconsin.	A. J. Schlueter.....	Wisconsin.
E. W. Herring.....	Wisconsin.	C. E. Summers.....	Wisconsin.
B. E. Hewitt.....	Wisconsin.	R. D. Thomas.....	Wisconsin.
J. G. Harrison.....	Wisconsin.	B. H. Tusler.....	Wisconsin.
C. G. Hubenthal.....	Wisconsin.	O. H. Wehrman.....	Wisconsin.
W. L. Kribohm.....	Wisconsin.	N. T. Ziglinski.....	Wisconsin.
Wm. Ketler.....	Wisconsin.		

CENTRAL COLLEGE OF DENTISTRY.

THE annual commencement exercises of the Central College of Dentistry were held in the German House, Indianapolis, Wednesday, May 1, 1901.

The number of matriculates for the session was sixty-three.

The degree of D.D.S. was conferred upon the following graduates by Dr. J. E. Cravens, president of the college:

A. E. Carrington.....	Indiana.	Luther McCullough.....	Indiana.
Fred. Dungan.....	Indiana.	Wm. McHatton.....	Indiana.
Carl M. Evans.....	Ohio.	John A. McPhail.....	Michigan.
E. E. Ewbank.....	Indiana.	C. C. Miller.....	Indiana.
Marsh Griffin, Jr.....	Indiana.	Leonard G. Mitchell.....	Indiana.
Vance Griffin.....	Indiana.	Frank E. Robinson.....	Indiana.
Chas. B. Harter.....	Indiana.	E. W. Seawright.....	Indiana.
Carl S. Hendricks.....	Indiana.	W. S. Trickham.....	Indiana.
Chas. A. Hollett.....	Indiana.	John D. Voss.....	Indiana.
Chas. Kneise.....	Indiana.	Chas. F. Walters.....	Indiana.
John W. Lowe.....	Indiana.		

VANDERBILT UNIVERSITY, DENTAL DEPARTMENT.

THE twenty-second annual commencement exercises of the Dental Department of Vanderbilt University were held in the chapel of the university on Tuesday, May 7, 1901.

The degree of D.D.S. was conferred on the following graduates by Dr. J. H. Kirkland, chancellor of the university:

Ernest F. Akers.....	Florida.	Philip E. King.....	Kentucky.
John W. Barnett, Jr.....	Alabama.	Thomas A. Leonard..	Tennessee.
Jesse V. Boswell.....	Missouri.	William F. McKibben	Missouri.
Bowen Bowen.....	Tennessee.	Charles W. Moody...	Tennessee.
Clement A. Breast.....	Tennessee.	John W. Newman...	Florida.
Thos. J. Brentlinger.....	Kentucky.	David S. Oman.....	Tennessee.
John H. Brown.....	Mississippi.	John H. Phillips.....	Alabama.
William F. Buckner.....	Tennessee.	Asher G. Ragland....	Kentucky.
Walter G. Cummins.....	Tennessee.	Rafael M. Ramos....	Mexico.
Reuben M. Delaney.....	Texas.	Stanley L. Rich.....	Tennessee.
DeBow Donoho.....	Tennessee.	William M. Robey...	North Carolina.
Albert F. Foley.....	Mississippi.	John E. Rowsey.....	Tennessee.
Frank P. Folmar.....	Mississippi.	John H. Rutherford..	Missouri.
William T. Gentry.....	Tennessee.	Neale M. Rutland....	Kentucky.
Geo. N. Guthrie, Jr.....	Tennessee.	A. L. Scarborough...	Alabama.
James O. Hall.....	Texas.	Strange L. Sinclair...	Indiana.
Ben. W. Harper.....	California.	Ernest L. Stevens...	Kentucky.
Harry A. Holder.....	Tennessee.	Walter H. White.....	Tennessee.
Walter G. Jackson.....	Texas.	Wm. W. Whitehead..	Mississippi.
Eugene A. Johnson.....	Tennessee.	Frank DeK. Wolfe...	California.
Paul M. Joyner.....	Tennessee.	Robert S. Woodard...	Tennessee.
John M. King.....	Alabama.		

HOWARD UNIVERSITY, DENTAL DEPARTMENT.

THE annual commencement exercises of the Dental Department of the Howard University were held in the First Congregational Church, Washington, D. C., Wednesday evening, May 8, 1901.

The address to the graduates was delivered by Hon. H. B. F. McFarland, Commissioner of the District of Columbia.

The number of matriculates for the session was thirty-four.

The degree of D.D.S. was conferred on the following graduates by J. E. Rankin, D.D., LL.D., president of the university:

O. H. Arnold....Dist. of Columbia.
 O. C. Arthur.... British West Indies.
 L. H. Fenderson. North Carolina.
 C. P. Grosby.... New York.
 I. Munger..... Minnesota.
 W. L. Munger... Minnesota.

E. E. Penso.... British West Indies.
 J. B. Riley..... Florida.
 W. M. Slowe... Pennsylvania.
 A. B. Lincoln.. Pennsylvania.
 A. E. Smyth... British West Indies.

OHIO COLLEGE OF DENTAL SURGERY.

THE fifty-fifth annual commencement exercises of the Ohio College of Dental Surgery, Department of Dentistry of the University of Cincinnati, were held at the Odeon, Thursday, May 9, 1901.

The address to the graduates was delivered by Prof. H. H. Smith, A.M., D.D.S., dean of the faculty.

The degree of D.D.S. was conferred upon the following graduates by D. W. Clancey, M.D., D.D.S.:

Henry L. Adler..... Indiana.
 R. G. Armstrong..... Ohio.
 Walter J. Barnaby.... Ohio.
 Harry S. Barr..... West Virginia.
 Carl Behr..... Indiana.
 L. D. Bourne..... Kentucky.
 Ferd. Brockmann..... Germany.
 Axel N. Bruzelius.... Massachusetts.
 Roy E. Buvinger..... Ohio.
 Chas. W. Calvert..... Illinois.
 Chas. A. Chadwick.... Michigan.
 Wm. E. Costello..... Ohio.
 Chas. T. Daggett..... Ohio.
 Miss K. G. Daniels.... Ohio.
 Herschel E. Deal..... Ohio.
 Wm. H. Delbridge, Jr. Colorado.
 Jas. C. Donaldson.... Ohio.
 Frank W. Doolittle... Colorado.
 Frank F. Duley..... Kentucky.
 Wm. G. Emery..... Ohio.
 Chas. E. Ewing..... Indiana.
 Mart Fant..... Michigan.
 Fred. L. Foust..... Ohio.
 Adna P. Fox..... Ohio.
 Edw. J. Gautschi..... Ohio.
 Mrs. A. N. Groth..... Ohio.
 Chas. F. Hagius..... Louisiana.
 Clarence V. Hall..... Indiana.
 George Y. Hall..... Ohio.
 Felix G. Hedges..... Kentucky.
 Roland L. Hoiles..... Ohio.
 Zach B. Houghton.... Ohio.
 Allen N. Kearby..... Texas.
 Warren P. Klepinger.. Ohio.
 Victor H. Knapp..... Indiana.

Julius L. Krause..... Germany.
 Wm. H. Kuhlmann.... Ohio.
 T. Samuel Jensen.... Louisiana.
 Harvey Lambert..... Ohio.
 David A. Leahy..... Ohio.
 Samuel M. Leeper.... Ohio.
 Harvey Leanard..... Maryland.
 Jno. R. McCready.... Ohio.
 Hosmere C. McKay... West Virginia.
 Harry E. Mathers.... Kentucky.
 Chas. W. Monroe..... West Virginia.
 Otto E. Oesterly.... Ohio.
 Walter J. Ohmer..... Ohio.
 Bert C. Pearce..... Kentucky.
 Fred. R. Pettit..... Michigan.
 Lon V. Reynolds.... West Virginia.
 R. C. Richardson.... Illinois.
 Geo. P. Roberts..... Indiana.
 Wm. Sauter..... Ohio.
 Fred. W. Shapley.... Ohio.
 B. A. Schwartz..... Ohio.
 Frank W. Schwartz... Ohio.
 Walter L. Scott..... Mississippi.
 Walter M. Scott..... Ohio.
 David C. Smallridge.. West Virginia.
 Chas. V. Spaniol.... West Virginia.
 Ernest Swartz..... Kentucky.
 Allen Q. Taylor..... Ohio.
 Jesse B. Taylor..... Illinois.
 Irwin W. Wendt..... Kentucky.
 R. C. Wescott..... Ohio.
 Walter W. Wilson... Indiana.
 Benj. F. Wolfe..... Indiana.
 Frank D. Wylie..... Ohio.

NEW YORK DENTAL SCHOOL.

THE commencement exercises of the New York Dental School were held at the Academy of Medicine, 17 West Forty-third street, New York city, Monday evening, May 6, 1901.

The address to the graduates was delivered by Richardson Gray, M.D.

The degree of D.D.S. was conferred upon the following graduates by Chas. Milton Ford, A.M., M.D., dean of the faculty:

Raymonde A. Albray.....	New Jersey.	Leighton G. Osmun.....	New Jersey.
Marjorie Andrews.....	New York.	Stephen A. Poluhoff.....	Russia.
Mary C. Kelly.....	California.	Wm. J. Stewart.....	New York.
Shoene L. Lipstein.....	Russia.	Martin Tepper.....	Germany.
Walter H. Morris.....	New Jersey.	Nell E. Hoffstadt.....	New York.

COLORADO COLLEGE OF DENTAL SURGERY.

THE fourth annual commencement of the Colorado College of Dental Surgery was held April 25, 1901, at the Brown Palace Hotel, Denver, Col.

The number of matriculates for the session was forty-one.

The degree of D.D.S. was conferred on the following graduates by H. A. Fynn, president of the college:

Eli S. Barnett.....	Utah.	Nicholas J. McGowan	Colorado.
Frank E. Dano.....	New York.	Fred. M. Stevens....	New Hampshire.
O. J. Heiser.....	Iowa.	I. B. Woodward.....	Colorado.
Edgar P. Lewis.....	Texas.		

DENTAL SOCIETY ANNOUNCEMENTS.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

THE nineteenth annual session of the National Association of Dental Examiners will be held at the Plankinton Hotel, Milwaukee, Wis., beginning Friday, August 2, 1901, at 10 A.M., and continuing in session until adjournment. The hotel rates will be: American plan, without bath, \$2.50 to \$4.50 per day; with bath, \$3.50 to \$5 per day. A fare of one and one-third has been arranged for on the Lehigh Valley Railroad, good from July 31st to August 10th inclusive, \$26.07 for the round trip. Trains leave New York at 8 A.M., 10 A.M., and 12 M., and Philadelphia 9 A.M., 10.30 A.M., and 12.30 P.M., connecting at South Bethlehem with main line; arrive at Buffalo 9.20 P.M., 9.35 P.M., and 9.55 P.M., in time for connection with Chicago express leaving at 10 P.M.; arrive at Chicago next day 1.28 P.M.; leave Chicago at 3 P.M., and arrive at Milwaukee 5 P.M. Buy single through ticket and take agent's receipt.

CHAS. A. MEEKER, D.D.S., *Sec'y.*

RHODE ISLAND BOARD OF REGISTRATION IN DENTISTRY.

A MEETING of the Rhode Island Board of Registration in Dentistry for the examination of candidates will be held at the State House in Providence, from June 12 to 15, 1901, inclusive, beginning each day at 9 A.M.

The theoretical examination will include anatomy, physiology, histology, bacteriology, chemistry, pathology, materia medica, therapeutics, operative

and prosthetic dentistry, crown- and bridge-work, metallurgy, orthodontia, anesthesia, and surgery.

Each candidate must come prepared with rubber dam, gold, and instruments to demonstrate his skill in operative dentistry. Candidates are expected to provide their own patients, but by giving two weeks' notice the board will supply them as far as possible.

All applications, together with the fee of ten dollars, must be filed with the secretary of the board before June 1, 1901, as no application for this meeting will be received after that date.

D. F. KEEFE, D.D.S., *Sec'y*.

MASSACHUSETTS BOARD OF REGISTRATION IN DENTISTRY.

A MEETING of the Massachusetts Board of Registration in Dentistry, for the examination of candidates, will be held in Boston, Mass., June 19, 20, and 21, 1901.

Candidates who have applied for examination will report to the secretary, Wednesday, June 19th, at 9.30 A.M., at Harvard Dental School Infirmary, North Grove street, and come prepared with rubber dam, gold, and instruments, to demonstrate their skill in operative dentistry. Any one who wishes may bring his patient; so far as possible patients will be furnished. The board in every instance selects the cavity to be filled.

The theoretic examination (written) will include operative dentistry, prosthetic dentistry, crown- and bridge-work, orthodontia, anatomy, histology, surgery, pathology, materia medica, therapeutics, physiology, bacteriology, anesthesia, chemistry, and metallurgy, and will be held at Civil Service Rooms, State House, from Thursday, June 20th, at 9.30 A.M., until Friday P.M., June 21st.

All applications, together with the fee of twenty dollars, must be filed with the secretary of the board on or before June 12th, as no application for this meeting will be received after that date. Application blanks may be obtained from the secretary.

G. E. MITCHELL, D.D.S., *Sec'y*,
25 Merrimack street, Haverhill, Mass.

NORTH CAROLINA BOARD OF DENTAL EXAMINERS.

THE North Carolina State Board of Dental Examiners will meet in Morehead City, N. C., June 24 and 25, 1901.

Examinations will be written, together with operations in the mouth. All applicants are required to furnish their own instruments and materials.

R. H. JONES, *Sec'y*,
Winston, N. C.

IOWA BOARD OF DENTAL EXAMINERS.

THE next regular meeting of the board will occur at Des Moines, Iowa, June 25, 1901. All wishing to appear for examination will notify the secretary as soon as possible.

F. A. LEWIS, D.D.S., *Sec'y*.

SOUTH DAKOTA BOARD OF DENTAL EXAMINERS.

THE next meeting of the South Dakota Board of Dental Examiners will be held at Vermillion, S. D., July 1, 1901. Applicants for examination should bring their operating tools and all materials necessary for filling with gold, etc., and such other work as the board may require.

G. W. COLLINS, *Sec'y.*

VERMONT BOARD OF DENTAL EXAMINERS.

A MEETING of the Vermont Board of Dental Examiners will be held at the Pavilion Hotel, Montpelier, Wednesday, July 10, 1901, at 2 P.M., for the examination of candidates to practice dentistry.

The examinations will be in writing, and include anatomy, physiology, histology, bacteriology, chemistry, metallurgy, pathology, therapeutics, surgery, materia medica, anesthesia, and operative and prosthetic dentistry, together with an operation in the mouth.

Candidates must come prepared with instruments, rubber dam, and gold; also, candidates will be required to take an impression, articulation, and set up a set of artificial teeth.

Applications, together with the fee (ten dollars), must be filed with the secretary on or before July 1st.

GEORGE F. CHENEY, *Sec'y,*
St. Johnsbury, Vt.

NEW JERSEY STATE DENTAL SOCIETY.

THE thirty-first annual session of the New Jersey State Dental Society will be held in the Auditorium, Asbury Park, N. J., commencing Wednesday, July 17th, at 10 A.M., and continuing in session Thursday and Friday. The "Columbia" adjoining will be the headquarters, with rates of \$2.50 and \$3 per day.

To the busy practitioner who desires to witness the latest and best efforts in clinical dentistry, Come! Fifty clinics! The best and newest efforts in the science of dentistry: Come and hear five papers read. For a veritable museum of the latest in electrical appliances, mechanical tools, the chairs, instruments and accessories of the modern dental office: Come and see us. Mark the days off now. You will see the contents of not only one dental depot, but all the best efforts in the way of inventions pertaining to our profession up to date. The city dentist as well as the one from the cross-roads can see and learn something.

CHARLES A. MEEKER, D.D.S., *Sec'y.*

DENTAL SOCIETY OF WESTERN CANADA.

THE second annual meeting of the Dental Society of Western Canada will be held in Friendship Hall, McIntyre Building, Winnipeg, Manitoba, on Monday and Tuesday, July 29 and 30, 1901. Visiting dentists will receive a hearty welcome.

GEO. C. MATHISON, *Sec'y.*

MISSOURI STATE DENTAL ASSOCIATION.

THE Missouri State Dental Association will hold its thirty-seventh annual session at Sedalia, July 9 to 12, 1901. A cordial invitation is extended to all reputable dentists to be present and participate in the proceedings. Special hotel and railroad rates have been secured.

Following is a partial list of essayists and clinicians:

Essays.—1. Dr. F. F. Fletcher, St. Louis: President's address. 2. Dr. W. L. Reed, Mexico: "Immediate and Bloodless Removal of the Pulp." 3. Dr. J. W. Hull, Kansas City: "Dentistry as a Fine Art." 4. Dr. L. W. Nevins, Chicago: "The Generation and Administration of Pure Nitrous Oxid Gas." 5. Dr. Geo. H. Gibson, St. Louis: "Oral Hygiene." 6. Dr. A. Tschirner, St. Louis: "Detrimental Effects of Soluble Organic Substances in Dental Cements." 7. Dr. H. E. Zorn, De Soto: "Habit." 8. Dr. Walter M. Bartlett, St. Louis: "Our State Law." 9. Dr. M. D. Hamisfar, Warrensburg: "Diagnosis from a Microscopic or Biological Standpoint." 10. Dr. B. L. Thorpe, St. Louis: "The Painless Separation of Teeth." 11. Dr. M. C. Marshall, St. Louis: "Some Clinical Experiences in Pyorrhea." 12. Dr. S. T. Bassett, St. Louis: "Porcelain Work." 13. Dr. Oscar Hammer, St. Louis: "Treatment of Pulpless Teeth." 14. Dr. Austin C. Hewett, Chicago: "Proof of the Value of Analgesics and Anesthetics in the Dental Office." 15. Dr. C. D. Lukins, St. Louis: "Orthodontia Illustrated by Stereopticon." 16. Dr. Truman W. Brophy, Chicago: "Surgical Treatment of Cleft Palate Illustrated by Stereopticon." 17. Dr. E. Bergstresser, Abilene, Kan.: "Science *vs.* Imagination." 18. Dr. W. V-B. Ames, Chicago: "The Utilization of Atmospheric Pressure with and without Air Chambers." 19. Dr. F. G. Worthley, Kansas City: "Diagnosis." 20. Dr. T. W. Arnold, Butler: subject to be announced.

Clinics.—Dr. Wm. Conrad, St. Louis, supervisor. 1. Dr. Truman W. Brophy, Chicago: Surgical clinic. 2. Dr. W. V-B. Ames, Chicago: (a) The utilization of atmospheric pressure with and without air chambers; (b) cement clinic. 3. Dr. E. Bergstresser, Abilene, Kan.: Filling *vs.* crowning. 4. Dr. Austin C. Hewett, Chicago: Combination gold and alloy filling at single sitting. 5. Dr. L. W. Nevins, Chicago: Administration of nitrous oxid gas and extracting. 6. Dr. D. O. M. LeCron, St. Louis: (a) The Peck method of porcelain inlays; (b) Porcelain crown- and bridge-work. 7. Dr. J. D. Patterson, Kansas City: The ideal base plate. 8. Dr. N. B. Stanza, St. Louis: Richmond crown. 9. Dr. J. T. Hull, Butler: Impression. 10. Dr. C. D. Lukins, St. Louis: Orthodontia. 11. Dr. E. N. LaVeine, Kansas City: Porcelain crown. 12. Dr. O. J. Fruth, St. Louis: Seamless gold crowns and inlays. 13. Dr. P. Holm Morrison, St. Louis: Removable root-canal fillings with silver wire. 14. Dr. S. C. A. Rubey, Clinton: Davis crown. 15. Dr. A. Tschirner, St. Louis: Some new and useful things. 16. Dr. L. E. Jenkins, Fredericktown: Combination filling, gold predominating. 17. Dr. Samuel Williams, St. Louis: A method of packing two colors of vulcanite. 18. Dr. W. W. Gardiner, St. Louis: A method of contouring crowns. 19. Dr. D. J. McMillen, Kansas City: (a) Swaging seamless crowns; (b) Demonstration of use of elevator. 20. Dr. J. F. Austin, St. Louis: Ideal cavity preparation for gold. 21. Dr. H. B. McMillen, Kansas City: Plaster cast of the face. 22. Dr. H. A. Cress, Warrensburg: Gold filling. 23. Dr. T. L. Pepperling, St. Louis: Banding a Logan crown. 24. Dr. W. L. Reed, Mexico: Pressure anesthesia for removal of live pulp. 25. Dr. A. J. Prosser, St.

Louis: The blending of gold and platinum in fillings. 26. Dr. F. W. Franklin, Kansas City: Rapid process of plating. 27. Dr. J. B. Vernon, St. Louis: Gold filling—Vernon's gold. 28. Dr. J. T. Richardson, Kansas City: Demonstrating gasoline blow-pipe. 29. Dr. J. L. Bridgeford, Macon: Extracting molar roots. 30. Dr. U. S. Hougland, Kansas City: Porcelain bridge-work.

F. M. FULKERSON, *Ch'man Ex. Com.*,
Sedalia.

B. L. THORPE, *Cor. Sec'y*,
St. Louis.

TRI-STATE DENTAL MEETING.

THE third triennial meeting under the auspices of the State Associations of Ohio, Michigan, and Indiana, will occur June 4, 5, and 6, 1901, at Indianapolis, Ind. The German House, corner of Michigan and New Jersey streets, has been secured for the meeting and exhibits. The Central Passenger Association has granted a round-trip rate of a fare and a third, on the certificate plan.

See full program of meeting in May issue of COSMOS.

For further information, address
GEO. E. HUNT, *Chairman*,
131 E. Ohio st., Indianapolis, Ind.

TENNESSEE DENTAL ASSOCIATION.

THE thirty-fourth annual meeting of the Tennessee Dental Association will be held jointly with the Southern Branch of the National Dental Association at Nashville, Tenn., beginning Monday, July 29, 1901.

A cordial invitation is extended the profession to be present.

A. SIDNEY PAGE, *Sec'y*,
Columbia, Tenn.

W. M. SLACK, *Pres.*,
Memphis, Tenn.

NATIONAL DENTAL ASSOCIATION.

THE fourth annual meeting of the National Dental Association will be held in Milwaukee, Wis., commencing Tuesday, August 6, 1901, and continuing four days. The Masonic Temple hall, which is conveniently located and especially suited to the various needs of the association, has been secured.

Special railroad rates are being secured and will be announced later.

All regularly organized dental associations are entitled to one delegate for each ten members, and these associations are urged to send full delegations.

Dr. G. V. I. Brown, of Milwaukee, chairman of the local committee, will engage rooms at the hotels and answer questions regarding local arrangements.

G. V. BLACK, *President*,
J. D. PATTERSON, *Chairman Ex. Com.*,
A. H. PECK, *Secretary*.

PENNSYLVANIA STATE DENTAL SOCIETY.

THE annual meeting of the Pennsylvania State Dental Society will be held at Ligonier, Pa., beginning Tuesday, July 9, 1901, and continuing three days.

Ligonier is situated ten miles south of Latrobe, Pa., about forty miles east of Pittsburg. It is an attractive mountain summer resort, with ample accommodations for the meeting. Programs giving full details will be issued shortly. Members of the profession in Pennsylvania and adjoining states are requested to note the date and arrange to be present.

C. V. KRATZER, *Sec'y.*

NEW YORK ODONTOLOGICAL SOCIETY.

IN MEMORIAM—DR. H. J. MCKELLOPS.

THE New York Odontological Society will hold a meeting *in memoriam* of the late Dr. H. J. McKellops, of St. Louis, in the Academy of Medicine, 17 West Forty-third street, on Wednesday evening, June 12, 1901, at 8 o'clock. Addresses will be made by eminent dentists, and all members of the profession will be welcomed.

EDITORIAL.

DENTISTRY AND THE UNITED STATES GOVERNMENT.

By act of Congress, approved February 2, 1901, a corps of dental surgeons was created in connection with the military service of the United States. The first effort upon the part of the dental profession in this country looking toward the establishment of a dental service in connection with the army was the favorable action of the Western Dental Society at its meeting held in Quincy, Ill., in July, 1858, upon a resolution introduced by the late Dr. H. J. McKellops creating a committee to take charge of the matter of securing national legislation for the desired end. Numerous efforts have been made in the intervening time, and the justice of the demand for dental care for those in the military service has at last been legally recognized. The formative stage of the movement is now a thing of the past, and the organization of this new department is in active progress.

The importance of the national recognition implied in the creation of this new department has been generally appreciated by members of the profession throughout the entire country; the significance of the act of Congress which established the dental surgeons corps has been recognized as marking an advance step in our professional status, and there has naturally been manifested a desire that the new relation should be upon a basis harmonious with our

best ideals; that no initial step should be taken which would tend to place dentistry in a false light or lessen its chances to demonstrate the rightfulness of its claim to a position of importance and dignity as a department of the healing art as useful and necessary to the soldier in the field as to the civilian in private life.

The present relation of the dental corps to the government service is that of contract surgeons, and, while the failure to secure the creation of a commissioned corps was cause for disappointment in the minds of many who were actively interested in the matter, there is in the present arrangement ample opportunity afforded for the dental corps to demonstrate its efficiency, and its future development will determine its status in accordance with its merits. The medical department of the service is fully equipped and organized to the minutest detail, and the official attachment of the dental corps to the medical department is a provision not only natural and eminently wise, but, working as they do for similar ends, it places the dental corps at once upon a basis of the best working efficiency. It is a matter of interest that, while the dental surgeons are classified as "attached to the medical department," the dentist receives his orders from headquarters, not from the army surgeon. The work of each is clearly defined by the army regulations, so that one does not trespass upon the field of the other. It is provided that the dentist and surgeon shall consult upon cases of mutual interest, but under the same ethical professional rules as are maintained in these relations in civil professional life.

The following regulations, being part of General Orders No. 52, recently issued by command of Lieutenant-General Miles, clearly define the position, duties, and medical relations of the army dental surgeons:

CONTRACT DENTAL SURGEONS.

Candidates for appointment as dental surgeons must be not less than twenty-four nor more than forty years of age. They must be graduates of standard medical or dental colleges, trained in the several branches of dentistry, of good moral and professional character, and prior to appointment will be required to pass a satisfactory professional examination before a board of dental surgeons convened for that purpose by the Secretary of War.

Contracts with dental surgeons will be made for three years, but may be annulled at any time by the commanding general of a military department, after official investigation, for conduct to the prejudice of good order and military discipline, or by the Surgeon-General when in his opinion a termination of the contract would be in the interests of the service.

Dental surgeons are attached to the medical department and will be assigned to duty in accordance with the recommendations of the Surgeon-General of the Army or the chief surgeon of a military department.

A dental surgeon when assigned to a station will apply to the post commander for a suitable operating room. If no other room is available the surgeon of the post may assign him a room in the hospital.

Each dental surgeon will ordinarily be allowed one enlisted man as an assistant, who will be detailed from the acting hospital stewards or privates of the Hospital Corps, and whose duty it will be to assist the dentist in his operations, in caring for the instruments and other public property, in keeping the records, and in the performance of such other official work pertaining to this position as he may be directed by the proper authority to do. When a member of the Hospital Corps is detailed as dentist's assistant he will receive commutation of rations at the rate of \$1 daily, and will be provided with a suitable room as quarters by the Quartermaster's Department, except while on duty at a post, when he will be attached to the Hospital Corps or other organization for rations and quarters.

Necessary dental instruments and supplies will be purchased by medical supply officers under instructions from the Surgeon-General and in accordance with a supply table to be approved by the Secretary of War.

Dental surgeons will be held strictly responsible for all instruments and supplies issued to them and will be governed by army regulations and orders now in force, or hereafter to be issued, with reference to accountability for government property.

In accordance with the act of Congress authorizing their employment, dental surgeons will "serve the officers and enlisted men of the Regular and Volunteer Army." The families of officers and civilian employes attached to the army are not entitled to their services. In this connection acting assistant surgeons are to be regarded as commissioned officers.

Dental surgeons will operate between the hours of 9 A.M. and 4 P.M. only upon those officers and enlisted men who are entitled to their services. They may operate upon others not entitled to free service before and after these hours when their services are not required by those entitled to them, but material issued to them by the government will only be used in operations upon officers and enlisted men of the army.

Dental surgeons will not perform any operation upon officers or enlisted men of the army or prescribe medicines for them other than those necessary for the treatment of the teeth and gums. This prohibition does not apply to cases of emergency where no medical officer is within reach, and where a dental surgeon is able to render the necessary surgical assistance to meet the immediate emergency.

Emergency work, whether for officers or enlisted men, should always have precedence. Plate work or restoration of teeth by any method will only be done for those who have lost teeth in the service and in the line of duty. For plate work or filling teeth only the cheaper materials will be supplied, but gold may be used, if the operating dentist sees fit to use it, at the expense of the individual operated upon.

Enlisted men requiring the services of the dental surgeon will, at an hour prescribed by the commanding officer, be conducted to the designated place under a non-commissioned officer, who will take with him and hand to the dentist a list of those reporting for treatment. This list will be entered in a daybook ruled in column for surname, given name, rank, company, regiment, etc.; all headings to be the same as those borne on his monthly report.

All cases requiring treatment involving future appointment will be so noted,

and the others will be marked according to the circumstances, as "treatment unnecessary," "further treatment unnecessary," "should be sent to the surgeon," etc. When future treatment is necessary the dentist will forward a card as follows:

....., 19....
 The Adjutant,

 Sir,—I have the honor to ask that.....be directed
 to report to me fromM. toM. on..... inst. for treatment.
 Very respectfully,

Dental Surgeon.

Dental surgeons will submit a monthly report in duplicate (on prescribed blanks) of all official work done by them, giving all required data in every case in which professional services have been rendered. This report will be an exact copy of the register kept for the period. One copy will be sent on the last day of the month to the Surgeon-General and one to the chief surgeon of the department in which the dental surgeon is serving.

With the exception of emergency cases, where the dental surgeon may render service as noted in the regulations, his work is specifically limited to the treatment of the following conditions:

DISEASES AND INJURIES OF THE TEETH AND MOUTH.

Abrasion (mechanical). Abscess of the jaws (associated with impacted teeth). Calcification of the pulp. Caries. Cysts of the jaws (associated with devitalized teeth). Dento-alveolar abscess. Erosion (chemical). Fractures of the teeth. Hemorrhage (following extraction). Hypertrophy of the pulp. Hypertrophy of the gums. Hypercementosis. Necrosis of the teeth. Pericementitis, acute. Pericementitis, chronic. Pulpitis, acute. Pulpitis, chronic. Pyorrhea alveolaris. Resorption of the alveolar processes. Salivary deposits.

NOTE.—The duties of the dental surgeon will ordinarily be confined to the treatment of such cases as are directly associated with the teeth; but occasions may arise when his services would be required as a specialist in the treatment of diseases and injuries of the mouth and jaws, such as: Cysts of the salivary ducts; Empyema of the maxillary sinus; Fractures of the jaws; Gingivitis; Necrosis of the jaws; Facial neuralgia; Stomatitis and Tumors of the gums and jaws, etc.

It will be seen that the limitations thus prescribed will practically avoid all clashing of professional duties or interests as between the surgeon and the dentist, while, on the other hand, ample provision is made that they should be mutually helpful,—an object which it is the spirit and intent of the official regulations to attain.

The remarkable care which the national government exercises in the selection of both its men and its supplies, in order to secure the best service and the best materials, is now extended to its dental service. The first dental examination was held on February 25th, since which date fifty-seven applicants for the position of dental surgeon have been ordered to report for examination. Nine failed

to report, and but seven of the remaining forty-six have been accepted. All candidates must pass a rigid physical examination, practically the equivalent of that required for enlisted men, and of the forty-six who have thus far presented themselves six failed to come up to the required physical standard.

The professional examination embraces a theoretical test and a practical test of the manipulative ability of the candidate.

The subjects of the written examination include all branches embraced in the curricula of the best schools of dentistry in this country. The candidate is given two hours in which to write his answers to a single subject, and is required to attain an average grade of seventy-five per cent. upon the total result of the examination, which consumes nearly one week.

The practical examination is a thorough test of the candidate as to his manipulative ability. In operative dentistry a patient is assigned to him, and he is required to make an examination of the mouth, recording upon a chart all conditions demanding treatment; and he is graded with reference to the accuracy of his diagnosis and its record. Then follows the removal of deposits; the preparation of cavities both by hand and engine instruments, with a grading upon his instrumentation and technique; the preparation and manipulation of filling-materials, and the insertion of gutta-percha, oxyphosphate, amalgam, and tin fillings; the treatment and filling of root-canals, and preparation of a root for a pivot crown. He is required to show proficiency, and is graded with reference to his ability in the application of the rubber dam, metallic separators, matrices, etc.; his diagnosis, prognosis, and treatment of oral diseases, and the care and sterilization of his instruments and hands. To complete the practical examination in operative dentistry necessitates work at the chair from 9 A.M. until 4 P.M. daily for at least three days, with an intermission of three-quarters of an hour daily for luncheon. In prosthetic work the candidate is examined as to his ability in taking impressions of the mouth, making casts, taking the bite, and adjusting the articulation; the construction of a denture in vulcanite; making dies and counter-dies from impression to completion; the construction of a swaged plate with metal and vulcanite attachments, and the construction of interdental splints. The swaged plate is to be made from a model of an edentulous jaw carved by the candidate to test his knowledge of the anatomical form of the jaw. The practical examination, including both operative and mechanical practice, consumes about one week, and the candidate is required to attain an average of eighty-five per cent. on the total number of practical tests.

The equipment placed at the candidate's disposal is elaborate and first-class in all its details ; and while the examinations are thorough, they are, both in theory and practice, easily within the compass of ability of any man who is competent to practice dentistry. If the same care and thoroughness were exercised in all examinations, a far better grade of dental practitioner would alone secure the right to practice dentistry.

The creation of the army dental service, with its attendant organization for the examination of candidates, establishes another and the most important relation which the national government is developing toward dentistry. This national relationship now presents no less than four important aspects, which, in the order of their evolution, are as follows :

First, the library of dental publications which forms part of the library of the Surgeon-General's office.

Second, the dental museum in connection with the same department.

Third, the army dental service and examining board.

Fourth, the recent action of the State Department with reference to the diploma frauds which are endangering the dignity and status of the American dental degree abroad.

Few practitioners perhaps realize the extent and value of the dental library of the United States government, or its practical availability for study and reference by the whole profession. There are probably very few dental libraries in the world which exceed it in the number of its titles, all of which are fully indexed and accessible. The museum is less fully developed, but contains many instructive and valuable specimens, and should be built up rapidly by contributions from all who care to help in fostering the growing interest of the government in dentistry.

The interest thus shown in the several items herein referred to is of more than superficial importance. It is probably not suggesting too much to infer that what is already done is but the nucleus of a much larger development. With a plan of examination so well organized and so thoroughly conducted, it would seem possible, by enlarging the plan somewhat and increasing the standard sufficiently, to in time create a national standard of dental qualification analogous to that in successful operation in Switzerland ; necessarily optional in character, but high enough to make its diplomates acceptable as practitioners in any or all of the states, and possibly in many foreign countries.

We bespeak for this relationship of dentistry to the national government a careful consideration upon its merits, for we regard

it as being fraught with important elements for the future good of dentistry in this country if the profession will co-operate with the good government in its dental work.

OBITUARY.

DR. HENRY J. B. MCKELLOPS.

DIED, at his home in St. Louis, Mo., April 23, 1901, Dr. HENRY J. B. MCKELLOPS, in the seventy-eighth year of his age.

There are many hearts which will be heavy with grief when they learn of the death of Dr. McKellops. No man in dentistry was more widely known, none more highly or more generally esteemed. Though long past the allotted threescore years and ten, he maintained, almost to the last, a warm interest in the profession for whose welfare he had labored more than a half century, and kept in close touch with every movement for its uplifting.

Henry Jerome Byron McKellops was born at Salina, near Syracuse, N. Y., August 31, 1823. His father dying before the son had entered his teens, he accompanied his mother and elder sister to St. Louis in 1840. Shortly thereafter he secured a position as page in the Missouri Legislature, and with the money he saved entered the State University at Columbia, in 1842, to which place his mother removed and remained for two years while he applied himself to his studies. The family returned to St. Louis in 1844, where young McKellops, after a course in book-keeping in Jones's Commercial College, found employment in the City Register's office, where opportunity presented for forming a wide circle of acquaintances valuable to him when later he entered upon the practice of dentistry. In 1846-47 he took a course in medicine at the old St. Louis Medical College. Through the persuasion of his brother-in-law, Dr. George Silvers, a dentist, he was drawn from medicine to the practice of dentistry, though he afterward enjoyed the distinction of having delivered the first white child born in Montana, an episode of a visit to that territory in the early days. Having a natural aptitude for mechanics and an inborn ingenuity, combined with an artistic temperament, he soon became an expert operative dentist, and quickly stepped to the front rank of his profession, attracting a practice of the highest class among the first families of the city.

From that time thenceforward, with the exception of a sojourn in London and Paris from 1863 to 1865 he continued his practice in St. Louis, retiring from active work only at the beginning of the present year because of failing health.

The cause of death was Bright's disease. The funeral was largely attended, many friends from other cities being present. Services were held at the grave by the St. Louis Lodge of Elks, of which Dr. McKellops was a member. The active pall-bearers were mostly from the St. Louis Dental Society. Among the honorary pall-bearers were Drs. Edward H. Angle, George A. Bowman, Albert H. Fuller, Emma Eames Chase, of St. Louis, and Dr. C. J. Tibbets, of Quincy, Ill. The Chicago Dental

Society sent a beautiful wreath of flowers, the St. Louis Dental Society a floral piece, as did Dr. Gordon White, of Nashville, Tenn., and many other old friends and patients.

Dr. McKellops was married April 4, 1849, to Miss Anna Gower, of Tennessee, who survives him, with five of their eight children: Dr. Henry L. McKellops and Mrs. Josie Bouvier, of San Francisco; Gerald G. McKellops, of Cincinnati; Linton J. and Dr. Leo Gregory McKellops, of St. Louis.

Of a strongly individualized character, Dr. McKellops became a leader in whatever path he entered. What he believed he believed thoroughly, with all the fervor of an intense nature; he was forcible in advocating whatever he thought was right, unsparing in denouncing what he thought wrong. He was a man of high ideals, sociable, and warm-hearted, a *bon vivant*, a brilliant entertainer, a hater of shams, a worker for better dentistry and higher attainments. He early saw the advantages to the profession of association, and was one of the most untiring workers in that direction. He was one of the founders of the St. Louis Dental Society in 1856, and in 1879 served as its president. In 1860 he helped to organize the Western Dental Association, of which he afterward became president; was the first president of the Missouri State Dental Association in 1865, president of the American Dental Association in 1879, and of the Southern Dental Association in 1885. He was a regular attendant of all of these and a frequent visitor to many others, and he was always a prominent figure in their proceedings. After clinics were established in the National Dental Association (successor to the American and Southern Dental Associations) he was made chairman of the section on clinics because of his well-known faithfulness in securing a high class of operations for the benefit of his fellow-members. A loving cup presented to him by the First District Dental Society of the State of New York bears this inscription: "Presented to Dr. H. J. McKellops by the First District Dental Society of the state of New York as an expression of high esteem and as a token of its appreciation of the inestimable services rendered by him as supervisor of clinics at the annual meeting, New York city, January 21, 1891."

An early recognition of his skill and of his many services to the profession was the conferring on him by the Ohio College of Dental Surgery in 1855 of the honorary degree of Doctor of Dental Surgery.

He quickly became famous as a skillful, conscientious operator, a fame which in time became known throughout the world. It is safe to say that an inferior filling never came from his office. He did not believe in amalgam, and never used it to any extent, but in the use of gold he had no superior, few equals. His constant effort was to make each succeeding operation better than the last. He introduced the continuous-gum process, invented by Dr. John Allen, to St. Louis dentists. His search for improvement was unending. It was his habit to examine and test all new devices offered, adopting in his practice those which he found good, and rejecting those which his judgment did not commend. Mere utility, unless it conduced also to fine work, had little weight with him. His decision in such matters was promptly reached, seemingly intuitive, and practically unerring, as the verdict of the profession at large almost without exception sustained his opinion in time.

To him is freely accorded the honor of having done more than any

other dentist in St. Louis to educate the better class of the public up to an appreciation of the importance of the care of the teeth, of the value of high-class dentistry in contrast with low-class work, and to an acquiescence in a proper remuneration for such services. His influence in these directions will continue to be felt now that he has passed off the field of action.

He was a consistent supporter of the code of ethics, and did not hesitate to speak his mind about infractions of it by practicing dentists. Many will doubtless recall his denunciation, twenty years ago, of the public written indorsement by practitioners of remedies of the component parts of which they knew nothing,—a denunciation which had much to do with breaking up the practice.

Whatever he knew was freely at the service of any practitioner who honestly wished to improve.

In his later years much of Dr. McKellops's time and large sums of money were devoted to the building up of a dental library. His collection of dental books was unquestionably the largest in the world. An offer of \$20,000 was refused for it a year or two before his death.

There was also a military side to his career. He was captain of the St. Louis cadets, commissioned by Governor Edwards in 1842, and in 1845 he became a captain in the St. Louis Legion. In 1846 he commanded the Morgan Riflemen in the Legion's six months' service in the Mexican War, making the noted expedition under Colonel Alton R. Easton from New Orleans to the Brazos and up the Rio Grande to Matamoras. He served also in the St. Louis National Guards in the riots in the fifties, and as assistant adjutant-general of the First Brigade in 1858 he marched across the state at the time of the troubles between the "Bushwhackers" and "Jayhawkers."

It was probably his military experience that led him to observe the necessity for the employment of dentists in the army. Accordingly we find him at the meeting of the Western Dental Association, at Quincy, Ill., July 21, 1858, proposing a resolution for the appointment of a committee to memorialize Congress on the need of appointing dentists to the regular army,—the first recorded utterance on the subject, as narrated in the DENTAL COSMOS for April. It is gratifying to know that Dr. McKellops lived to see the accomplishment of his wise suggestion, even after the lapse of forty-two years.

In every walk of life there are figures which stand out from their fellows, raised on a pedestal, as it were, by their native abilities and the work they accomplish. Dr. McKellops was such a figure in dentistry. Some of the traits which distinguished him have been indicated in this brief sketch of his life. He loved his profession and labored unceasingly for its progress and advancement. His indomitable courage and unwavering persistency in the accomplishment of an object, combined with his personal charm, made him a power in its councils,—a power that was always exerted on the side of better things. Of distinguished, magnetic presence, and courteous, kindly manner, he attracted all who came into personal contact with him. He was a warm friend and he could be an uncompromising foe; yet be it said, most of his antagonisms were with things, not men,—with conditions which he wished to see improved, not with the men fettered by those conditions. He lived to see many of the reforms which he advocated accomplished facts and

he had the proud consciousness that he had been an important factor in bringing them about. Truly of him it may be said, "his works do follow him."

F. L. H.

The Society of Dental Science of St. Louis held a special meeting April 29, 1901, at which the following resolutions were passed:

WHEREAS, In the death of Dr. H. J. B. McKellops the dental profession has sustained a great loss which will be felt throughout the length and breadth of two continents, and

WHEREAS, The members of the profession in St. Louis and especially of this society, who best knew the depth of his friendship and felt the inspiration of his example, will mourn his loss most deeply; therefore, be it

Resolved, That the Society of Dental Science of St. Louis hereby expresses its full appreciation of the valuable services rendered our profession by Dr. McKellops during his long and active life, and

Resolved, That, in recognition of his distinguishing services and the great honor in which he held his profession, a suitable biographical memorial be prepared and framed, with his photograph, and hung in the rooms of this society, and

Resolved, That a copy of these resolutions be sent to the family and to the dental journals and spread upon the minutes of this society.

EMMA EAMES CHASE,

HERMANN PRINZ,

B. E. LISCHER,

A. B. FULLER,

Committee.

The Cincinnati Odontological Society adopted the following memorial at a meeting held April 26, 1901:

MEMORIAL TO THE LATE DR. H. J. MCKELLOPS.

It is with emotions of profound grief that this society learns of Dr. McKellops' death. To numbers of our members the news brings a deep sense of personal loss. Through association with the local profession as a regular attendant on the meetings of the old Mississippi Valley Dental Association, Dr. McKellops made many friends in this city. In many respects he was a remarkable man. Of his reputation as a dentist nothing need be said. In the dental convention he exercised over all a peculiar fascination, due to a strong personal magnetism. One quickly became impressed with a sense of his straightforward honesty of sentiment, which appeared in his obvious hatred of sham and pretense. Dr. McKellops was a man of keen discrimination and of settled convictions which he never hesitated to announce without fear or favor. In debate he showed unusual aptitude in extracting the substance of an opponent's argument, recapitulating the points sought to be established, commending or condemning with equal impartiality. His speech was clear, incisive, and in debate often rose to the point of eloquence. Withal Dr. McKellops was a friend to the humblest member of the profession whom he believed to be earnest, sincere, and worthy.

Few men of the dental profession have traveled further or explored more thoroughly in remote quarters, in search of improved methods, or to test the merit of new inventions. His judgment in accepting or rejecting these was singularly reliable, and seldom failed to be sustained by the opinions of others to whom he recommended the results of his inquiries.

In the death of Dr. McKellops the profession has lost a member who, by virtue of personal qualities as well as by the example of loyal adherence to the highest standards of professional attainment, was an inspiration to all who came within the circle of his influence.

FRANK W. SAGE,

C. M. WRIGHT,

J. S. CASSIDY,

Committee.

DR. EMMANUEL LECAUDEY.

DIED, February 12, 1901, at his residence, Boulevard Malesherbes, Paris, in his seventy-third year, Dr. EMMANUEL LECAUDEY.

Dr. Lecaudey was born in Coutances, Manche, January 27, 1829. At an early age he moved to Paris and began the study of dentistry under the tutelage of M. Richard d'Aulnay, Sr. Through continuous work and perseverance he very soon acquired a competent knowledge of the dental art and became assistant operator to M. d'Aulnay. But his ambition did not stop here, for no sooner had he completed his dental education than he entered upon the study of medicine. He first studied under the direction of Dr. Vernon and later completed his course in Erlangen, receiving from that university the M.D. degree. He did not direct his attention to general medical practice; but from the beginning he continued in the ranks of dentistry, where his conscientious and intelligent work was duly appreciated by his numerous patients, who looked upon him not only as their dentist but also as their friend.

The instinct of charity was highly developed in him, and none could have made better use of the accumulated results of an exceptionally large practice than he did.

Not only the dental profession of France, but also that of the whole world, feel that the death of Dr. Lecaudey leaves a vacancy difficult to fill; it has been a shock to all who knew him personally or through his works.

Dr. Lecaudey presided over the progressive movement which took place in France in 1880 and resulted in the foundation of l'Ecole Dentaire. He devoted time and energy to the welfare of this school, whose history is closely connected with the name of this eminent practitioner.

He was honorary director of l'Ecole Dentaire of Paris, honorary president of the Third International Dental Congress, honorary president of the Association des Dentistes de France, honorary president of the Société d'Odontologie; his active interest in educational progress was recognized by his appointment as "Officier d'Académie," and he was also Chevalier of the Legion of Honor.

DR. WM. H. BURR.

DIED, at his home in Madison, Ga., WM. H. BURR, M.D., in his eighty-fifth year.

Dr. Burr was born in New Jersey, August 25, 1816. In 1844 he was graduated as M.D. from the Jefferson College, Philadelphia, taking this course to better fit him for the practice of dentistry, which he had already chosen for his life work. Shortly after his graduation he established himself in dental practice in Madison, Ga., where he continued to reside until death.

His ambition in life was not to acquire wealth or the distinction that a successful practice in a large city would have brought him, but rather by faithfully doing his duty by the small *clientèle* of a country town, that he might live in modest comfort and enjoy a share of leisure that would enable him to pursue literary, social, and domestic pleasures, which appealed strongly to his taste. His knowledge of both dead and living languages was such as to open the way to much enjoyment and profitable research in the literature of other times and languages, while his familiarity with the higher branches of mathematics and astronomy, and his efforts to lead those in whom he was

interested to learn something of these sublime sciences, made him a useful and valued friend to several whose minds were awakened to the possibilities of higher knowledge by his efforts.

His professional skill was exceptional, and among his patients he counted a number of eminent men who came from a distance to profit by his services, and when the Georgia State Dental Association was organized in Savannah, soon after the close of the war, his worth was recognized by his brethren by his election as its first president.

He married, in 1849, Miss Harriet Hill, by whom he had one son, who died in 1886. Mrs. Burr died about a year ago.

HINTS, QUERIES, AND COMMENTS.

CHINESE DENTISTRY IN SIAM.—The manner in which the Chinese dentist makes an artificial denture may be of interest to readers of the DENTAL COSMOS.

The operator first takes an impression of the mouth by means of a black mass resembling dirty wax, composed of stick-lac boiled with cocoa-nut oil. This is moistened or dipped in water, the patient at the same time rinsing his mouth to keep the composition from adhering to the teeth. In obtaining the impression, the material is placed in the mouth and forced with the fingers into position, the operator not having the least idea of impression trays. The material is then removed and is, so far as the eye can tell, a fairly good impression of the mouth. The next step is the forming or making of the plate, which is of gold or silver. The impression is the only model. From it measurements are taken, the metal being cut to these measurements and then beaten to conform to the general outline of the impression. Afterward the plate is trimmed and cut to fit round the teeth, and adapted to the impression by means of pliers. When the plate fits the impression according to his liking he has only to produce the rugæ. To accomplish this part of the work the impression is coated with red paint, the plate is then placed in it, and when removed it is colored red except where the rugæ are; so that it is an easy matter to depress the plate at these points by means of a blunt instrument and hammer. To be sure of the fit the impression is repainted, and if the plate is perfectly colored upon the under surface the operator is satisfied that it is correct.

It will be noticed that all this is accomplished with the one impression, which has not been mutilated in the least.

The artificial tooth or teeth, composed of ivory or bone, are to be made and fastened to the plate. This material is filed, as far as the artistic skill of the operator will permit, to the proper size and form. The tooth being completed, is riveted to the plate, a ledge being left at the lingual surface of the tooth for that purpose. The time required to make a denture of this description is about two days. The dentist sees his patient but twice,—for the taking of the impression and the final visit for the making and fitting of the tooth. The writer has seen some of these plates in position and can say, after taking into consideration the primitive methods used, that they fit fairly well, and were it not for the ivory would be quite serviceable. As it is, they last about eight months.

Other methods are employed for the insertion of anterior teeth, but are not as good as the one described. For example, two or more teeth are formed

of one piece of ivory and retained by means of gold, silver, or copper wire ligated to the remaining teeth. Also, a single tooth is wedged into the space of a missing one. But this is of no practical use, as the separation caused by the wedge is so great that a new tooth is required in a short time.

Of the above methods the first is the best, but is lacking in usefulness from the fact that it is impossible by it to obtain a full denture. The plate not having a true adaptation to the parts, depends principally upon the natural teeth for support.

The practice of this native dentist is almost limited to extractions and the insertion of silver fillings. The instruments in use for extraction are very crude and consist of four mechanical pliers, two of which are large with curved grooved beaks, the remaining two having their beaks bent at the points in order to get a better hold on the roots. The excavators consist of one spoon-shaped instrument, long and narrow, and one small carpenter's chisel about an eighth of an inch broad.

The Chinese are known for their economical traits, and as this native dentist is not an exception, he saves the silver filings from plates for fillings, which are amalgamated with mercury, the fingers being used as pluggers.

Another operation which he is called upon to do is the cutting or filing off of the six anterior teeth, superior or inferior. The Siamese are very fond of short, even teeth, and will suffer much to have them so, although nature seems to have intended otherwise. For this operation the patient is placed in a reclining position, a small block of wood being used as a bite-block. The operator then proceeds with a coarse mechanical file to shorten the anterior teeth, apparently not being particular about wounding the patient's mouth. If the teeth prove too hard for the file a saw is then used, with painful destruction of the teeth and soft parts. The operator evidently neither knows nor cares anything about nerves; but simply thinks of the thirty cents (Mexican) which is to be his fee for the operation if satisfactory to the patient. This minor operation is completed in about two hours, for either the upper or lower six anterior teeth.

Regardless of pain the Siamese endure this operation, while they shrink from the extraction of a tooth which if left to itself would probably drop out in a few days.

This brief description of Chinese dentistry in Siam may not add to our knowledge of the profession, still it is worth while to let the other part of the world know how things are done here.—PAUL T. CARRINGTON, D.D.S., Bangkok, Siam.

LIST OF UNITED STATES PATENTS PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING APRIL, 1901.

- April 2.*—No. 671,299, to GIDEON SIBLEY. Head-rest for dental chairs.
 " "—No. 671,300, to GIDEON SIBLEY. Head-rest.
 " 9.—No. 671,929, to CORNELIUS F. HORGAN. Rubber dam.
 " 16.—No. 672,081, to CHAS. A. PALMER. Swaging apparatus.
 " "—No. 672,163, to ALONZO C. CALDWELL. Removable denture.
 " "—No. 672,392, to JOHN C. BLAIR. Fountain spittoon.
 " 30.—No. 672,920, to HARRY SHOEMAKER. Dental plugger.
 " "—No. 673,010, to V. W. GILBERT. Support for artificial dentures.

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler. A star (*) indicates a thesis.

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THE
DENTAL COSMOS.

VOL. XLIII.

PHILADELPHIA, JULY, 1901.

No. 7.

ORIGINAL COMMUNICATIONS.

AN EFFECTIVE CURE OF SUPPURATIVE INFLAMMATION OF THE
UPPER JAW BY MEANS OF PYOCYANEO-PROTEIN.

BY DR. JOHN JESENSKY, PRAGUE.

THE patient, a man over sixty-five years of age, well-nourished and vigorous, never suffered previously from any serious disease. Syphilitic infection was decidedly denied, and the author himself could find no evidences of any constitutional disturbances caused by syphilis.

In the spring of 1895 the patient had the upper left second molar filled. In July, 1898, the tooth became so acutely painful that he was compelled to have it extracted. The dentist who performed this operation did not succeed in extracting the tooth; fractured it, and, without making any attempt to remove the roots, dismissed the patient, promising that perfect comfort would be soon restored.

The pain, though not attended with swelling of the gum or cheek, did not abate. The next morning the patient applied again to the dentist, who made several attempts to remove the fractured root, but all his efforts were fruitless. After returning home the patient suffered horrible pains, and in the evening his cheeks began to swell. Next morning his face was considerably swollen; the upper gum thickened to such an extent that he could not open his mouth, and all the upper teeth, previously quite firm, were loosened and tottered in their sockets.

The third day a physician was sent for. He forced the patient's mouth open and extracted the quite healthy left lateral to enable the abscess to discharge pus. The swelling went down, and the thickening of the gum subsided. Ten days afterward the patient was sent by the physician to the Prague Hospital.

The treatment at the hospital consisted in cutting the gum open by several incisions, and in syringing out the wounds daily for six

weeks. During this time several fistulæ, continually discharging pus, formed in the gum. Neither the extraction of roots of the fractured tooth and the removal of a fragment of bone, which ensued some two months after, nor the syringing of the fistulæ with a new solution prescribed at the hospital had any permanent curative effects. This treatment lasted until the end of the year 1898, when the patient came under the writer's treatment.

The then existing stage of the disease showed the following symptoms: The entire upper gum was considerably thickened, softened, spongy, and of a deep red tint. Into the oral cavity from the buccal surface of the gum nine fistulæ opened, discharging continually a thick, viscid pus of yellow-greenish color, almost absolutely free from any offensive, putrid smell. The united fistulæ were on both sides of the gum, the distal ones piercing it above the roots of the second bicuspid, while above the roots of the centrals a fistula penetrated the gum, opening also into the nasal cavity. Above the almost entirely exposed root of the left bicuspid was situated an ulcer, the bottom of which showed the edges of the eroded alveolar lamella. From under the thickened borders of the ulcer profuse pus was oozing. To these facts must be added that the teeth in the whole upper jaw were, of course, still considerably loosened, though we were not able to find any mobility or crepitation of this part of jaw. As far as pain was concerned, the patient did not complain; he had merely a sensation of pressure and tension in the diseased part. Nevertheless, he was greatly troubled by discharge of pus, chiefly during the night.

With respect to the diagnosis, these facts require to be considered: The disease arose suddenly. The thickening of the entire upper gum and the bilateral swelling of the cheeks appeared subsequent to the extraction. The teeth, previously quite firmly fixed in their sockets, became loose almost simultaneously within a space of some hours after the operation.

If there were in question a mere infection of the wound, attended with inflammation, it would be extremely difficult to explain so rapid, almost sudden, an appearance of the above-mentioned symptoms.

The facts that the entire row of teeth was suddenly loosened and that the fistulæ burrowed deeply into the bone, seem to be conclusive enough to determine that the disease was confined to the jawbone, whereas the antrum of Highmore remained entirely unattacked.

The affection was explained as due to the following changes: The toothache which impelled the patient to consult a dentist was caused by inflammation of the alveolar periosteum. The painful extraction performed by force produced, on the other hand, an infectious periostitis and osteomyelitis, which spread rapidly through the mass of the alveolar border of the upper jaw.

The patient was submitted, without delay, to a treatment consisting essentially in syringing out the fistulæ. We tried all usual antiseptics and astringents without success in arresting the morbid process. Professor Nessel shared our first view, suspecting the

patient of syphilis, and believed that the disease must improve under general treatment. But also this long course of medical treatment proved by no means successful. The writer abandoned all therapeutic agents of that sort, and began, at Professor Hlava's advice, to examine the affection microscopically.

A tubercular consumption and actinomycosis may be excluded beforehand. The microscopical specimen containing pus crowded with different varieties of micro-organisms attracted our special attention. There were separate micrococci, and others arranged in groups and chains, rod-shaped and thread forms, varying in length and size. Among these organisms such a startling quantity of spirilla prevailed that other forms were at first sight hardly visible. The spirilla were not only lying beside one another, as is usual with most specimens containing oral mucus, but heaped and twisted, forming knots and clusters. Besides that, the specimen was infected with particular forms, perhaps identical with those described by Dr. Miller, of Berlin, under the name of *Iodococcus vaginatus*.

The culture flasks contained the following micro-organisms: Pneumococci, staphylococci, several varieties of different micrococci, small bacteria resembling *Bacillus influenzae*, *Bacillus pseudodiphtheriae*, a thread-shaped micro-organism (*Cladothrix nigra*), and saccharomyces. On the malt-agar grew one colony having a shape of small dots similar to that of oral spirilla, but we did not succeed in transferring this fungus to another nutritive substance. A subcutaneous injection killed a mouse in one day or so, and the rapid death proved to be due to pneumococcus.

As we were not able to arrest this disease by means of antiseptics, which may be attributed either to the fact that the solution with which the fistulæ were purified did not penetrate into the smaller folds of mucous membrane, thus leaving them still insusceptible to the action of drugs, or to the obstinacy of the process itself, due to the mixed infection and presence of great quantity of spirilla, we ventured to try in this obstinate case a special treatment.

In a recent treatise on "The Cure of Ulcus Cruris by Means of Proteids of Bacteria," Dr. Honl, of Prague, in conjunction with Dr. Bukovsky, places on record about a hundred cases in which the worst forms of this disease were completely cured by means of pyocyaneo-protein in a remarkably short time. The curative effects of this remedy forced us to try it in our case, and we commenced with washing and syringing out the fistulæ twice a day with the above-mentioned proteid.

This treatment had, without doubt, a very beneficial effect. In a few days the gum regained its natural, healthy red tint; the discharge of pus from the fistulæ decreased considerably, and the teeth became firmer from day to day. After three weeks, a striking abatement of local and subjective symptoms was perceptible. The gums had an almost normal appearance; the fistulæ, open as they were, discharged pus only when it was pressed out.

We then examined the pus again. The microscopical specimen was similar to that of the first examination, but it contained a less

number of spirilla and other bacteria. The pus was subcutaneously injected into a mouse and *per venam* into the ear of a rabbit without injury to their health.

We kept on with this cure. Besides the hitherto performed syringing, we applied also lint soaked in pyocyaneo-protein to the ulcer. After only six weeks two fistulæ situated above the left bicuspid and the left central discharged a scanty, thin pus. In order to accelerate the healing, we extracted both affected teeth, and freely removed at the same time a piece of dead bone (sequestrum). The wounds were again syringed and packed with strips of lint dipped in pyocyaneo-protein, and this proceeding was persisted in till the suppuration ceased and the treatment resulted in permanent cure.

The speedy relief following the use of the therapeutic agent as described, attended as it was with cessation of the main symptoms, the subsequent complete cure of such an obstinate case, and especially the fact that the virulent pneumococci lost their activity, admits of but one interpretation (though it is but a single case, and the peculiarities of the cure are by no means fully explored), viz, that all these beneficial changes were due to the use of pyocyaneo-protein.

It remains to be said that these experiences impelled us to attempt also the cure of pyorrhea alveolaris by means of pyocyaneo-protein. Though we are still unable to pronounce with great certainty upon the final results, for the cure is not yet complete, we hope, judging by the existing stage of improvement, that we shall have also in this related disease the best results.

CHEMICAL EROSION OF THE TEETH.

BY DR. LEON FREY, PARIS.

(Read before the Third International Dental Congress, Paris, August 8, 1900.)

THIS term is applied to a process in which the hard dental tissues are eaten or wasted away, principally upon the labial surfaces near the cervical margins of teeth (Bödecker, "Anatomy and Pathology of the Teeth"). Erosion is characterized by its hardness and polish. This alteration had already been recognized and specified by Black,* Kirk,† Perry,‡ and others. Erosion was carefully studied by Znamensky, professor at the University of Moscow, under the name of *cuneiform deformity*.

American authors reserve the name abrasion to the mechanical wasting of teeth. They give the name of atrophy to those congenital structural troubles that we know in France under the name of erosion. Fournier employs the term atrophy in the article upon the teeth, in his dictionary in sixty volumes. This term is also used by Harris and Austen.

*Black, "Abrasion and Erosion of the Teeth," *American System of Dentistry*.

†Kirk, "Erosion," *International Dental Journal*, 1886.

‡Perry, "Erosion," *International Dental Journal*, 1895.

Description.—Upon teeth that are generally large, white, and polished, and which are not covered by tartar, a loss of substance is observed at the neck and sometimes upon the enamel surface proper. It begins as a very limited spot, but gradually it increases in size. The small hole or undercut becomes progressively of large size. On a vertical section of the tooth the erosion presents a triangular form, with the apex toward the pulp and the base toward the periphery. The size of the erosion varies; sometimes the loss of substance is limited to a horizontal direction, it may take the form of an undercut, or, lastly, it may affect the entire surface of the tooth, diminishing the thickness of the crown upon its entire extent. In a case observed by Michaels half of the labial surface of an upper right canine was entirely destroyed, and presented the appearance of the mouth-piece of a flute. Black has observed a case where the erosion had diminished the length of the incisors. This condition was not brought about by articular abrasion, for the articulation was such that the anterior teeth did not touch.

These conditions appear more frequently upon the labial surface, and sometimes upon the approximal, but seldom upon the lingual surface. The margins of the eroded surface are very well outlined, just as though they had been prepared with a saw. The lower one is more marked than the upper, but sometimes they also have blunt margins. The surface in the majority of cases is of a glossy appearance. With the naked eye, irregularities cannot be detected, but Znamensky has shown that with a strong lens a few saucer-shaped cavities can be seen. In some cases the cavities can be plainly seen, even without the use of the lens. It is on the number and size of these saucer-shaped cavities that the modifications observed upon the surface of the eroded spots depend, for at the bottom of these cavities the glossy aspect is gradually lost, and may be replaced by blunt inequalities.

The coloration of the erosion is most variable. Ordinarily it is of the color of the tooth, with a polished appearance, but it can also be of a deeper yellow, brownish, and even nearly black. The same surface may present several colorations; the center may be very deep, while the periphery is lighter, becoming confused with the remaining portion of the tooth.

The consistence of the eroded tissues also varies, and the darker the bottom of the cavity is the more resistant will be the tissues under the excavator; when the surface is rough, the hardness and sensitivity are less.

The eroded surfaces are sensitive to cold, sweet and salty substances, to acids, to the contact of instruments, of the brush, and of the finger-nails. The sensitiveness of the eroded portion of the tooth is not always the same. When the dentin is not discolored the eroded surface is very sensitive, even to slight contact of the finger-nail; but if the dentin is dark, the sensitiveness is less. Sensitiveness varies according to the character of the chemical erosion, and its intensity varies in the same eroded surface; it may be more acute in a period of nervous excitement or during a period of dyspeptic crisis. In the latter case it can be questioned whether

it is due to salivary hyperacidity or to nervous hyperexcitability of the patient.

How does this "cuneiform deformity" develop? First the gums begin to retract. Bödecker holds that the gums are always inflamed and retracted; the neck of the tooth is exposed; a layer of cement disappears, leaving the dentin unprotected, and small, saucer-shaped cavities, separated from each other, are formed. This erosion becomes gradually deeper, but as a general rule the progress is slow. Nevertheless, upon teeth that are not very strongly organized the erosion becomes very rapidly deep (Znamensky). At this stage of the disease the pulp begins to react by producing secondary dentin. This secondary dentin is sometimes formed in such great quantities that it fills up completely the pulp-cavity. But, notwithstanding this production, it may happen that the erosion becomes deeper all the time, until it reaches the opposite side and separates the crown from the rest of the tooth. When the course of the disease is rapid (although taking up several years), the pulp may not have enough time to defend itself; it becomes inflamed and dies.

The anterior teeth are attacked with greater frequency than the posterior; those of the right side, according to Franck Acker, more often than those of the left. Bödecker says that the teeth more apt to suffer from erosion are the canines; then follow the bicuspid, and then the incisors. According to Black, the incisors are most frequently affected, the canines coming after.

One tooth alone may be affected, and, again, cases are also on record where all the teeth presented chemical erosions. The same tooth may be eroded in several places. The teeth of the superior maxilla are more liable to suffer from erosion than those of the inferior. Often homologous teeth are attacked. Where the arch is irregular, the teeth projecting inward are seldom attacked.

Walkhoff has pointed out the very interesting fact of "cuneiform defects" observed upon artificial teeth; Wedl, upon teeth inclosed within dermoid cysts of the ovaries; it has also been observed upon the elephant's tusks.

Pathological Anatomy.—The anatomo-pathological observations which are included in the works of Baume, Walkhoff, and Schlenker are not as yet plainly interpreted. Baume, as well as Znamensky, holds that chemical erosion is very unequal, and that it is formed by a line of cup-shaped cavities, analogous to Howship's lacunæ. Walkhoff believes that these cavities are present at the beginning of the lesion, but denies their existence at a later stage of the disease.

It has been said that around these cavities the dentin presents fissures parallel to the canaliculi, but Schlenker and Walkhoff say that those fissures never exist except in dry preparations, and believe that desiccation produces them. All these authors recognize the existence of a zone more or less narrow of translucent dentin which limits the cuneiform deformity.

Pathogenesis.—Mechanical Theory.—This refers to abrasion, properly speaking. Dr. Cruet, in his treatise on pathology, incriminates brushes, powders, and other causes of friction. He says,

"Erosion is observed principally in very careful people who use dentifrices to excess." This theory is also admitted by Tomes, Zsigmondy, Salter, Niemeyer, and Parreidt.

Chemico-Mechanical Theory.—Schlenker, Walkhoff, Bastyr, Scheff, and Brandt are the authors who advance and support this theory. Under the influence of chemical elements of a more or less acid character, a thin layer of dentin is decalcified. This softened portion is removed in the act of cleaning the teeth, and by the friction of the cheeks and lips during mastication. The surfaces are glossy on account of friction, and are of a hard consistence, for only the softened portions can be removed.

Bastyr made the following experimental demonstration: He took teeth already attacked and enveloped them in wax, leaving uncovered the eroded spot. He then placed them in an acid solution in such a way that only the eroded surface would be acted upon by the solution. After a few hours the teeth were removed from the solution, and the surface of each erosion was brushed for a few seconds with a soft brush. Little by little the defect became larger and deeper, preserving always a polished and regular bottom.

This theory cannot explain the presence of cuneiform defects upon the teeth of oxen, horses, cows, whose saliva is constantly alkaline; upon teeth found in ovarian cysts, where the liquid is alkaline; upon the elephant's tusks, which are not surrounded by saliva; upon teeth of individuals who never make use of brushes and powders.

Let us recall the opinions of Leber and Rottenstein, who considered the cuneiform defect as a variety of caries of slow evolution, the attacked portions disappearing constantly, and the friction of the cheeks and lips preserving to the diseased surface its apparent polish. They were induced to believe in this theory by observing in the canaliculi under the microscope the presence of leptothrix,—a micro-organism to which such an essential rôle is attributed in the production of caries.

Chemical Theory.—Coleman denies absolutely the theory of mechanical influence, and it is only to the acids that he attaches a pathogenic importance.

Michaels (Congress of Lyons, 1898) believes in the chemical theory. He attributes erosion to the action of pathologic saliva, and considers that the labial salivary glands play an important rôle in the production of erosion. "These are situated between the muscular coat of the orbicularis oris and the mucous membrane, which is raised on account of their presence. They are very numerous, and surround the entrance to the oral cavity. They are more numerous on the lateral portions than at the level of the commissures. These glands are situated in the substance of the submucous connective tissue, and are surrounded by adipose tissue. "In order to examine these glandular orifices, the lip is raised and turned outward; it is then dried. After a minute the small drops of liquid which they secrete may be seen on the surface."

What chemical principle in the saliva can dissolve the enamel and produce erosion? According to Michaels, the alkaline sulfo-

cyanids, whose action he explains in the following way: They dissolve the ossein of the teeth and expose the mineral elements, with which they form sulfocyanids of calcium and soluble phosphates of potassa and ammonia.

Michaels, in order to prove his hypothesis of a chemical reaction in the pathogenesis of erosion, made the following experiment: He placed in a liter of water one gram of potassium sulfocyanid. He plunged into the sulfocyanid solution one of the arms of a capillary tube of the shape of an inverted U; the other one was very pointed, and had attached to it a metallic wire, which in turn held a tooth. After several days the surface of the enamel presented erosions absolutely similar to those found in the mouths of individuals suffering from this lesion.

Mechanico-Vital Theory.—Baume holds that the superficial layer of dentin not covered by gum-tissue or by enamel dies and falls out mechanically, being exfoliated by the friction of the lips, brushes, etc.

Schlenker, Walkhoff, Bastyr, and Miller object that the layers of mortified dentin cannot have any sensitivity, and that, on the contrary, the surface of the chemical erosions is nearly always exceedingly sensitive.

Dentinal Theory of Znamensky.—We give this name to the idea of Professor Znamensky for the following reason: According to him, the cuneiform defects are only a modification of the dentin,—a modification that may take place even outside of the mouth, but whose production is facilitated in certain conditions as yet unknown, and probably due to the diathesis of the individual. According to Znamensky, the enamel does not take any part in the formation of these cuneiform defects. They are due “to a disappearance of the cement substance and to the swelling of the organic portions of dentin.”

Let us recall the composition of dentin, which comprises an organic and an inorganic portion. When treated with an acid which dissolves the calcareous salts, the dentin appears as being made of an organic substance of cartilaginous consistence. This substance, insoluble in water, is transformed into gelatin by boiling. This gelatin is composed of two organic substances,—ossein and elastin. The ossein is analogous to the substance of which the connective tissue fibers are composed,—the collagen substance. The ossein is transformed into gelatin when submitted to the action of dilute acids carried to the temperature of boiling water or by submitting it to the action of water overheated in the Papin boiler.

Elastin is an albuminoid substance found in abundant quantities in elastic fibers. It is insoluble in dilute acids, but decomposes under the action of sulfuric acid or of concentrated nitric acid; hence it is more resistant to the chemical agents than ossein. Elastin is probably the substance that forms the walls of the canaliculi and the sheaths of Neumann. After treating the dentin with an acid, and then the organic matter by boiling, the greatest part of this is transformed into gelatin and an insoluble residue remains; this is elastin (Amoëdo in “Poirier’s Anatomy”).

According to Znamensky, the starting-point of the affection is in the organic substance, which he calls the *dentoidin*, which would disappear in lesser or greater quantity. To confirm this hypothesis, Znamensky has tried to verify it experimentally upon teeth by boiling them in an acid medium and by heating. For the boiling procedure he uses a twenty to twenty-five per cent. solution of hydrochloric acid, which he places in the Papin boiler. The temperature in this boiler varies from 105° to 160° C., a temperature at which occurs a more or less complete disappearance of the organic substance. At 105° , 110° , or 115° only the superficial portions of the enamel are touched; the organic substance disappears, and the calcareous salts, not being supported any more, also disintegrate. The erosion obtained in this way can be very well polished with a hard brush, and takes the form of a cuneiform defect. The rest of the tooth was protected with a plate of tin, having an opening to permit the brushing of the root near the neck. At a higher temperature the salts of calcium separate with greater facility, and the cavity becomes deeper; the translucency of the dentin, too, is more extended. Under the microscope, saucer-shaped depressions are seen, while to the naked eye its surface appears glossy and polished. Beyond 125° the dentin of the whole tooth becomes vitreous and transparent.

In all these experiments the enamel lost very little of its hardness; it merely became brittle. It resisted the action of the brush, and the cuneiform defect was limited in proportion to the quantity of dentin removed from beneath.

Znamensky compares the action of *dentoidin* to that of oxyphosphate in the combination of cement and amalgam. If this mixture is put in a twenty to twenty-five per cent. solution of hydrochloric acid, the oxyphosphate dissolves; the amalgam remains intact, but is only a powder of amalgam, without any cohesion.

In another series of experiments, and in order to act upon merely a limited portion of the tooth, Znamensky used the heating process; it is done by implanting teeth in a thick mass of plaster of Paris, and only leaving the necks of the teeth exposed, against which the point of the flame of a blow-pipe is directed. He observed that the cavity became deeper the longer the flame was allowed to act. The dechondration has for immediate result to destroy the slight union between the dentin and the enamel. The enamel, not being fixed so tightly as before to the dentin, breaks, sometimes with a dull sound that would make it seem as if the dentin were swollen on the inside. The dentin appears as a semi-transparent girdle upon the borders of the portion that disappears.

With regard to the polish of the eroded surface, Znamensky holds that it is an inherent characteristic of the constitution of dentin, as is the case in stearin sections, which are always regular and smooth, even when they have been made with a blunt knife. He considers erosion in some way as a dentinal function, independent of all chemical or mechanical action (which would then become accessory, secondary). Znamensky undertakes to explain in this way the cuneiform defects of teeth included within an ovarian cyst, and of

the elephant tusks in their extra-buccal portion. The mechanical agents can only hasten the mechanical separation of the isolated portion.

He also explains the different aspects of erosion: When the loss of organic substance is slight, the calcium salts, which are solidly held together, disintegrate gradually and with difficulty, in such a way that the surface is always smooth. If, on the contrary, the dentoidin disappears *en masse*, the calcareous salts separate very easily, and a series of saucer-shaped cavities appear on the surface of the eroded spot.

Etiology.—The pathogenic theories that have been described have all some facts to support them. We see, however, by their number and variety that the question of etiology is as yet in obscurity.

The chemical erosion is found at all periods of life after the ages of twenty or twenty-five; there is no record of cases in younger persons. According to Znamensky, it generally attacks old people, but we believe that, on the contrary, this disease attains its maximum development and acuteness from thirty-five to fifty years. It is at this period of life that we see the greatest number of people complain of sensitiveness to contact, cold, etc. It is at this period that erosion is most active. Later on the secondary dentin has defended and fortified the attacked portion, unless caries has not continued the destruction of the teeth. The proportion of men suffering from erosion is greater than that of women. It is observed in all latitudes, but nevertheless the warm and humid climates exercise an undeniable predisposing cause (Snyder, *Dental Review*, February, 1898).

Among the other predisposing causes there is one which is of capital importance. This is arthritism, and especially the form having gouty manifestations. Seventy per cent. of Snyder's cases were observed in gouty individuals. It is known that arthritism is the great predisposing cause of pyorrhea alveolaris, nevertheless there is certainly no concomitancy between these two affections. The arthritic with pyorrhea has tartar in quantity, often gingivitis, due to this cause; the teeth are generally of a yellow color; the alveolo-dental articulations are weak; early in life the child presents slight congestive manifestations; the teeth become slightly loose, and other slight phenomena which we may call the "minor signs" of polyarthrititis. It is a rheumatism of all the articulations; it is sometimes of diabetic origin.

The arthritic with erosion has no tartar. On the contrary, his teeth are very white, always polished, and very solidly fixed in the alveoli. At the level of the erosion great sensitiveness exists to cold, especially to fresh air, to acids, to sugar, and even to salt. The patient is generally a neuro-arthritic, with acid dyspepsia, predisposed to nephritic colics, and to gravel. These rheumatic manifestations are altogether abarticular, tendinous, and muscular. It is frequently in a gouty person, and never in a diabetic, that erosions are active. In the same way as a gouty individual can become a simple rheumatic, so also in the arthritic the erosions may be arrested. They cease to become extended, to deepen, to

become sensitive, and instead he may become an arthritic with pyorrhea. Tartar may then be present; nevertheless in general the articular infection, the alveolar rarefaction, and the suppuration will take place without any apparent deposit. The polyarthritis will generally be of the dry form so well described by Cruet.

We may remark that the individual presenting these two manifestations of the dental arthritism (erosion and pyorrhea) is first attacked by erosion; very seldom or never does pyorrhea set in first.

Is there any etiological relation between erosion and caries? Until now researchers have not presented any conclusions in this connection. There seems to be a kind of antagonism between the tooth predisposed to caries, through its calcareous weakness or organic richness, and the tooth predisposed to erosion through its calcareous richness (as the salts become detached from their organic framework) or through its organic weakness,—for the organic framework is too weak to retain the calcareous salts (Baume's thesis), or because of pathological transformations (Znamensky's thesis).

Nevertheless caries may reach an eroded region. The first may have reached the mesial surface, the second the labial surface. In such cases it is very curious to observe that generally the two lesions do not become fused. Caries continues to present itself with its irregular layers of softened dentin, the erosion preserving its smooth aspect and its resistant bottom more or less pigmented.

Treatment.—Medical.—General: Anti-arthritic, anti-rheumatic, anti-gouty. *Local:* The use of soft brushes, or at least the brushing at the level of the erosions. Use of alkaline dentifrices. Use of antacids, gum arabic, and saccharin (Constantine Paul). *Surgical:* The *lips* (Michaels); ignipuncture of the labial glands. The *teeth*—treatment directed against the sensitivity of the erosion. Cauterizations with silver nitrate; with antimony chlorid (Michaels), which has the advantage of not staining the teeth. Filling of the cuneiform erosion with gold by preference. Sometimes the teeth can be protected with metallic crowns.

ADENOIDS AND MALFORMATIONS.

BY FANNIE E. HOOPES, M.D., D.D.S.

(Read at the union meeting of the District of Columbia Dental Society and the Maryland State Dental Association, May 16, 1901.)

"THE chronic enlargement of tonsillar tissue is an affection of great importance, and may influence in an extraordinary way the mental and bodily development of children," says no less an authority than Dr. Osler; and the condition is too frequently overlooked by the general practitioner.

When adenoids are present, the most direct effects are mouth-breathing, deformity of the thorax, and change in facial expression; the characteristic expression being vacant, dull, heavy, and apathetic, in part due to the fact that the mouth is habitually kept open. The lips are thick, the nasal orifices small and pinched-in

looking; in the mouth the superior dental arch is narrowed, and the roof considerably raised. The chest deformities are liable to be mistaken for rickets, the commonest cause for such deformities in this country. The anterior ribs are prominent; the sternum is angulated forward at the gladiolo-manubrial junction and grooved at the gladiolo-xiphoid junction; saucer-shaped depressions are found at the lower costal cartilage; the lower angle of the scapula projects. Headache and listlessness occur; there is inability to pronounce *m* and *n*, nasal consonants. Block lays stress on the association of mouth-breathing and stuttering. In addition to these physical effects, there is usually a marked mental deterioration. The fetor of the breath is generally marked; the hearing is impaired, owing to pressure or extension of inflammation along the Eustachian tube. There may be no great enlargement of the tonsils and nothing apparent at the back of the throat, and yet the naso-pharynx may be completely blocked with adenoid vegetations.

By digital examination in children, the growths can be felt as small, flat bodies, or, if extensive, as velvety, grape-like papillomata. Adenoids which spring from the vault of the pharynx vary in size from that of a small pea to an almond; they may be sessile, with broad bases, or pedunculated; they are reddish in color, of moderate firmness, and contain many bloodvessels. They are abundant as a rule over the vault in a line with the fossa of the Eustachian tube, but the growth may be posterior to the fossa,—namely, in the depression known as the fossa of Rosenmüller,—or upon parts which are parallel to the posterior wall of the pharynx. They appear to spring in the main from the mucous membrane covering the localities where connective tissue falls into the inequalities of the base of the skull. (Harrison Allen.)

Hypertrophy of tonsillar structure is occasionally congenital, or it may follow diphtheria and the eruptive fevers. The frequency with which it occurs has been variously stated. Sixty cases were found by Chappelle, of New York, in an examination of two thousand children. It is usually found in children or young adults, being rare after forty years of age. The mean age is sometimes given as from five to seven years.

Cuvillier, of Paris, treated 2785 children; 569 with simple hypertrophy of tonsils, 1156 with hypertrophy with adenoids.

In infants such growths are indicated by inability to nurse properly; a desire for frequent change of position; the open mouth during sleep, with snoring and enlarged faucial tonsils.

In cases of this disease, the tonsils present a condition of chronic hypertrophy, due to multiplication of the constituents of the glands; lymphoid tissue may be chiefly involved without much development of the stroma. In other instances the fibrous matrix is increased, and the organ is harder, smaller, and firmer. In hypertrophy, when there is inflammation, the leucocytes whose province it is to act as scavengers cannot do their work, and the thickening of the tissue harbors organisms.

No race of people is found to be free from this trouble. It is prevalent in all parts of Europe and America, and climate seems to

exert little if any influence over it. Nor is it a modern disease; an inspection of ancient paintings and sculpture will reveal occasional peculiarities indicative of adenoids. Marcus Antonius, for one, must have been a sufferer in his childhood.

It has been stated by many writers, and it seems to be the general impression among rhinologists, that the high palatal arch and the long, narrow face are directly connected, either as cause or effect, with the occurrence in children of naso-pharyngeal lymphoid hypertrophy. Grosheintz's deductions are as follows:

"1. With high, narrow alveolar arch (*hypsisstaphylia*) is usually associated a general narrowing of the upper face (*lepto-prosopia*).

"2. Narrow nasal passages (*leptorrhinia*) and narrow orbits belong as a rule to the skull formation having high-arched palates.

"3. *Hypsisstaphylia* (high uvula) depends as a rule upon congenital racial characteristics of the skull, and not upon later extra-uterine influence of nasal stenosis."

While it seems that adenoids are not conceded to be the cause of narrow jaws, yet they produce symptoms which bring them under the observation of physicians.

Meiser's measurements. The index of the upper face he obtains by measuring from the fronto-nasal suture to the alveolar border of the superior maxilla in order to get the length, and by measuring the distance between the malar eminences in order to get the breadth; then the length multiplied by 100 and divided by the breadth gives the index required.

By a large number of such measurements he established the fact that in his part of the world (German Switzerland) fifty-four per cent. of all people have an index thus obtained of fifty or less. These he calls cases of *chamæ prosopia* (wide nasal fossa, broad face), while in sixty-four per cent. the index is over fifty. These he calls *lepto-prosopia* (narrow face).

Children are often of peculiar disposition when afflicted with adenoids, which are the cause of many morbid conditions, like spasmodic asthma, cough, vertigo, gastric, and cardiac symptoms, which are attributed to nasal irritation. The secondary effects, as a result of nasal obstruction, are seen in accompanying pharyngitis, bronchitis, emphysema, diseases of the eye and ear. We have clinical reports of cases of tinnitus, asthma, and suppurative otitis media relieved by the re-establishment of nasal respiration. In view of Dr. Fränkel's anthropometric investigation, it would seem proper to accept the deduction that the shape of the hard palate has more direct connection with the type of skull (*lepto-prosopic*) than it does as a sequence of post-nasal adenoids.

Long-headed (*dolicho-cephalic*) people—breadth of the head being less than seventy-five per cent. of its length—have narrow nasal passages. Alkan (*Archiv für Laryngologie*, vol. x, No. 3) seems to refute Fränkel. He asserts that the skull lengthens during the growing period of life until there is not much difference in height and breadth.

Antero-posterior measurements of the hard palate increase with age much more than breadth measurements. Alkan accepts the

theory that the lateral pressure of the cheeks and their muscular fiber drag on the external border of the alveolar arch when the mouth is habitually open on account of nasal obstruction, and that the retraction of the upper lip, by taking the pressure off the superior incisors, induces projecting lower jaw (prognathism).

The fact that the pathological condition of lymphoid hypertrophy is much more common with the high-arched palate than with the normal, which is denied by Fränkel, is plausibly explained by the assertion that the conditions have a common factor. While many are inclined to doubt the constant relation of cause and effect from adenoids to narrow jaw, few will deny their frequent coincidence (although long, narrow high arch does sometimes exist without mouth-breathing). In conclusion, Alkan declares that the shape of the hard palate, so far as its height is concerned, has nothing to do with the configuration of the skull. (J. Wright, Brooklyn.)

Quoting Dr. John Mackensie, the eminent laryngologist of our city, "Deformity of the jaw as a result of nasal and retronasal obstruction in children always affects the upper, not the lower jaw, and varies according to its occurrence before or after the beginning of the second dentition. In the first instance there is simply a general dwarfing of the whole jaw, a cupola-shaped high palate, and an elliptical alveolar process. After the second normal dentition the alveolar processes come nearer each other more and more, making the jaw longer and narrower; the dome of the palate becomes thereby much higher and narrower at the sides. The anterior end of the process loses its perpendicular position; is thrown forward, and forms an acute angle in the middle line. This throws the central incisors, and later the other teeth, into positions with which all are familiar. This latter deformity often causes a diminution in the vertical diameter of the nasal passages with bony deformity,—most commonly of the septum. It is a curious fact that centuries ago Morgagni called attention to this arching of the palate, and ascribed to it the chief rôle in the production of the deflection of the septum."

In addition to the disfigurement caused by the irregularity of the teeth, the malocclusion brings about malnutrition, for children so affected cannot masticate their food thoroughly. Owing to nasal obstruction, secretions are constantly dropping which affect taste, causing lack of appetite. The air (on account of the mouth-breathing) is not warmed and filtered by nature's methods; the blood in consequence is not properly oxygenated. In fact, metabolism is interfered with in every way, with the result of ill-nourished, anemic children, often with defective mentality.

While so many eminent authorities of reputation differ so radically about this subject, definite conclusions cannot be stated. Moreover, every one is more or less influenced by personal experience in making deductions, and we have all met with cases of marked hypertrophy of the tonsils with apparently normal oral conditions; hence we will have to fall back on the old adage "exceptions prove the rule," and continue investigation for further proof.

"What is the end of study? Let me know.

Why, that to know which else we should not know."

I wish to express my thanks to Dr. John N. Mackensie and Dr. Frank Dyer Sanger for many valuable suggestions.

SOME THOUGHTS ON PORCELAIN WORK.

BY V. WALTER GILBERT, D.D.S., PHILADELPHIA, PA.

DURING the past two years, much has been said and written upon the subject of porcelain and its application to the practice of dentistry, more especially as regards its use in the production of inlays for fillings and in the construction of crowns and bridges. To those who have had experience in this line of work, most of the essays and discussions have been interesting and instructive, but to those who have had little or no such experience the lack of detail and instruction in technique has been an obstacle to the more extensive use of the valuable methods involved. My only excuse for writing upon the subject at this time is a desire to help those members of the profession who would like to try porcelain in the later development of its uses, but who hesitate because they are not familiar with the methods or the materials and appliances required in connection therewith.

As to the value of porcelain in the applications under consideration, that has now been sufficiently tested by those qualified to judge, and the fact thereby thoroughly established that while the field of porcelain work is limited, yet, when indicated, it is an excellent material for replacing lost parts of teeth.

Before attempting to explain the technique of its use, it would be well to have some knowledge of the various grades of porcelain material at our command.

At the present time, porcelain powders are divided into two classes, designated as "high-fusing" and "low-fusing" bodies. The terms "high" and "low" are purely relative terms as to fusibility; they convey no intelligence regarding the composition or general characteristics of the materials to which they are applied. The profession seems to have accepted these terms, however, so they will be employed in this article. For the benefit of those who do not understand the difference between the so-called high-fusing and low-fusing bodies, it may be explained that the powders which fuse above the fusing-point of pure gold are known as high-fusing, and those which fuse below that point are known as low-fusing.

Both grades of material have their advocates in the ranks of porcelain workers, but, in the light of several years' experience, it is the opinion of the writer that the low-fusing powders should be let severely alone, especially by those who employ porcelain in the construction of crown- or bridge-work.

When speaking of the various makes of porcelain (so called) now in the market, it will be necessary to designate them by the name of the manufacturer, and, as this article is written for the benefit of dentists, and not for the benefit of manufacturers, I speak without fear or favor. As the result of carefully conducted

tests of the fusing-points of the porcelain bodies now on the market, it has been found that—

In the class of LOW-FUSING powders, arranging them in the order of their fusing-points, the first named being the lowest, will be placed the following:

Derenberg's Porcelain Enamel.

Dr. Jenkins's " "

Dentenax.

Downie's Porcelain Body.

Ash's Low-fusing Body.

In the class of HIGH-FUSING powders, arranging them in the order of their fusing-points, the first named being the lowest, will be placed the following:

Ash's High-fusing Body.

Consolidated Co.'s High-fusing Inlay Material.

Brewster's Enamel Body.

" Foundation Body.

The S. S. White Co.'s High-fusing Porcelain (Inlay).

" " " (Crown and Bridge).

Close's Continuous Gum Body.

Allen's " " "

Parker's Body.

By comparing the names as they appear in both lists, it will be observed that Derenberg's porcelain enamel has the lowest and Parker's body the highest fusing-point. I cannot state the range of these extreme temperatures in degrees, but in practical working nomenclature it is from "cherry red" to "white hot." Between these extremes are to be found the powders indicated for the purposes under consideration.

Porcelains intended to fulfill the requirements must possess strength, permanency of color, minimum amount of shrinkage, a fusing-point sufficiently high to make their attachment to high-grade porcelain teeth permanently secure, and the working quality of being sufficiently fine in texture to permit of accurate carving. These qualifications can only be found in those powders which partake of the nature of porcelain, and not of glass or enamel; they must therefore be high-fusing. Now, while experience has demonstrated that only high-fusing bodies are suited to crown- and bridge-work, it is also true that not all high-fusing bodies are practical. In other words, some of the high-fusing bodies lack some of the other essential qualities.

For continuous-gum dentures the Close and Allen bodies have met with wide approval, but for crown- and bridge-work both of these are too coarse and granular to permit of fine carving and of presenting a good surface both before and after fusing. If placed in a mortar and ground for some time, both the Close and the Allen body can be so reduced in texture as to permit of their being carved; the grinding also reduces the fusing-point and improves the surface. The high-fusing porcelain (Crown and Bridge) made by The S. S. White Dental Mfg. Co. is fine in texture, has a good fusing-point

and the minimum of shrinkage, and is supplied in twelve colors, which makes it possible for the artist in porcelain work to produce any shade he may desire. For the making of inlays, the high-fusing porcelain (Inlay) of The S. S. White Dental Mfg. Co., Brewster's Enamel Body, and the High-fusing Inlay Material of the Consolidated Co. will be found preferable.

Porcelain seems to find its greatest range of practical usefulness in its application to crown-work, not only on account of its esthetic qualities, but also because of its strength and of its capabilities for making the finished work hygienic.

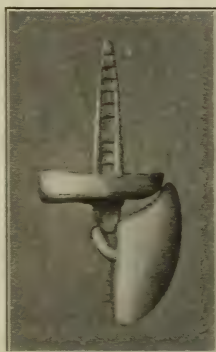
An important step to be taken in the construction of nearly all crowns and bridges is the reinforcement of all connected parts with a metal framework.

Dr. H. J. Goslee, of Chicago, was one of the first to point out the necessity and advantages of taking this precaution, and I know of no better method than that pointed out by him in the January

FIG. 1.



FIG. 2.



(1900) issue of the *Dental Review*, which detail should be read by all contemplating porcelain work. In the construction of the ordinary cap and collar crown the root is banded with a narrow piece of platinum plate of No. 28 or 29 gauge, using platinum solder (Au. seventy-five per cent., Pt. twenty-five per cent.) to make the joint. To the band a piece of platinum of No. 29 gauge or iridio-platinum of No. 30 or 31 gauge is soldered, forming the floor of the cap.

The question of form to be given to anchor posts has always been open to discussion; some preferring round, others square or triangular wire. Personally, I believe a post having the shape of the pin in a Logan crown is the best. Whatever the shape of the post, it should be sufficiently long to permit of firm anchorage in the natural root and to extend beyond the floor of the cap far enough to engage the pins of the porcelain facing.

Figs. 1 and 2 will show the methods of connecting the post and cap to the facing.

Platinum solder is to be used in making all connections.

The metal framework for bicuspid and molars calls for the same general detail, with the provision of an additional metal post for strengthening and supporting the lingual cusps. Judgment must be exercised in determining the size of this post. Too much metal tends to weaken the porcelain, and for this reason only a very small post should be used, such as shown in Fig. 3. A platinum pin from an ordinary rubber tooth is just right for the purpose.

BODY.

After the metal-work has been completed, pickled, tried in the mouth and found satisfactory, the piece is ready to receive the porcelain body. Great care must be taken in doing this part of the work. The "first bake" cannot be carelessly or hurriedly performed, for much of the success or failure depends upon this first or "biscuit" bake.

FIG. 3.



Cleanliness is essential in mixing the powder, which should be placed on a clean glass or porcelain slab and mixed with clean water to the consistence of dough.

Holding the work in a pin-vise, apply the body, and conform it to the minutest crevices by tapping the handle of the vise with the mixing spatula. (Fig. 4.) The tapping will bring the moisture to the surface, whence it should be absorbed with blotting or bibulous paper. Gradually add the body, until it assumes the general form and proportions desired in the finished crown. At this stage, the work is ready to receive its first fusing.

THE BISCUIT BAKE.

By the "biscuit bake" is meant that stage in the fusing process when the "body" becomes hard, but not glossy; when shrinkage has taken place, and the mass seems to be covered with minute shining particles. If allowed to remain in the furnace until the fusing-point is reached, the chances are that in the final fusing the porcelain will "sputter" and produce a porous, weak, and dirty-looking crown. A crown which has been made of good porcelain and properly "biscuited" will have lost about twenty per cent. of its bulk.

After the crown has received its biscuit bake, it may be tried upon

the articulating model and the material ground off or added where necessary to proper occlusion and approximal contact.

For the second or final bake, the desired shade of body is mixed and carefully added until the crown is slightly larger than is required. Experience only will determine just how much extra body will be necessary. It all depends upon the care taken to absorb the moisture during the application of the body. If the body is "wet" when applied, the fire will cause more shrinkage than it would if the body had been applied dry (that is, with the minimum of moisture).

FIG. 4.



For the final fusing, the heat is applied gradually and the crown allowed to remain in the furnace until the body assumes a smooth, glossy surface, corresponding to that of natural enamel. Fig. 5 shows three finished molar crowns made of solid porcelain, no facings being used.

Figs. 6 and 7 show finished anterior crowns, with facings.

SHADING PORCELAIN.

The proper shading of a crown calls for the exercise of artistic skill, in developing and employing which the worker in porcelain will find much pleasure and remuneration. The mixing of colors

FIG. 5.

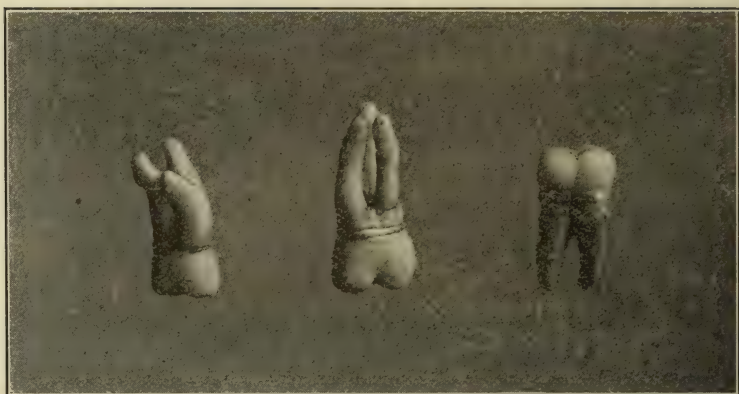
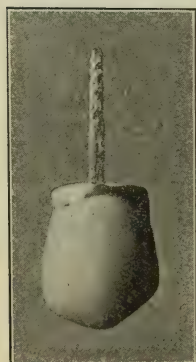


FIG. 6.



FIG. 7.



to produce tooth shades is not to be learned from reading, but must come from the hard knocks of experience. Diversified tints of unlimited variety can be produced by altering the proportions of the basal colors, and by the proper blending of the desired tints very natural effects can be produced. The basal color of nearly all teeth is light yellow, and it will be found very practical to use this color in building up that portion of a crown which corresponds to the dentin in the natural organ. The unnatural appearance of many artificial crowns is due to the fact that they are of one uniform color, and not of two or three shading into one another, as we find in the natural teeth.

Since the advent of high-grade porcelain in the requisite colors there has been no excuse for solid-color crowns, for it is now possible to closely approximate the natural teeth in their varying shades, even to the staining of fissures and streaking of enamel.

The best way for a beginner in porcelain work, therefore, is to experiment in the mixing and fusing of colors before he attempts the construction of a practical inlay or crown. This work can be made immediately profitable in experience, for he will need a set of sample shades made from the materials he is to work with. He will find greater satisfaction in working to shades of his own compounding than with any fixed samples of mixes supplied by the manufacturer of the material. Of course, in making these buttons he will need to note carefully the exact proportions in each experiment. He will thus have an invaluable record, and every experiment will serve as a guide in his future practical work; the failures advising him what to avoid, the successes pointing the clear way to useful practical results.

FUSING.

In the opinion of the writer, the electric furnace is the one best suited for the work. Not only is it noiseless and clean in its action, but it can be run with more certainty of success by the inexperienced than any of the furnaces heated with oil, coke, gasoline, or gas. An electric furnace having a rheostat is preferable, for the reason that the heat can be readily controlled,—a feature which is essential in deriving the best results from porcelain.

The work to be fused is placed on a Brophy fire-clay support (Fig. 8) of proper size and shape, placed in the oven, and the current turned on with the contact lever of the rheostat on the first button. Five minutes at this temperature will thoroughly drive all moisture from the piece, and the heat can then be applied gradually until the desired degree of fusion has taken place, when the lever of the rheostat should be gradually pushed back and off.

Theoretically, the *annealing* of porcelain adds to its strength, and in the case of large pieces practice will show that it is wise to take this precaution. At any rate, a too rapid cooling will injure the work, if it does not utterly destroy it. The electric furnace with rheostat is an ideal annealer, allowing the heat to be gradually reduced from the fusing-point to a point where the piece can be removed from the furnace with the fingers. It is not always convenient to wait so long for the proper cooling of a piece by the

above means, and in such cases it can be removed from the oven as soon as the "glow" has disappeared and placed in a muffle provided for cooling purposes.

FIG. 8.



No amount of reading will make one proficient in working porcelain; there are too many little details which experience only will make manifest, in the fusing as well as in the mixing of colors, but they are quickly learned, and the results so made possible with this excellent material will fully repay those who handle it with care and discrimination.

A SUB-MENTAL FISTULA CAUSED BY A DEAD TOOTH WITHOUT CARIES; OLD TRAUMATISM; SECONDARY INFECTION OF RHEUMATISMAL ORIGIN; CURE.

BY PAUL E. GIRES, M.D., D.D.S.,
AND

H. RODIN, M.D.,

CHIEF ORAL SURGEON OF THE LARIBOISIERE HOSPITAL, PARIS.

(Read before the American Dental Club of Paris.)

MR. PRESIDENT AND GENTLEMEN: The case to which I have the honor of engaging your attention is that of Miss T., twenty-nine years of age, who was treated at the oral clinic of the Lariboisière Hospital for a fistula opening under the chin.

The patient seems to enjoy good health, but has had acute articular rheumatism; shows several nervous stigmata, and is hysterical. At about eighteen years of age she had a series of epileptiform hysterical attacks, very frequent at first, which have become rare, although they have not entirely ceased.

In the year 1891, during one of those attacks, the patient broke three upper incisors, but is not conscious of having injured any of the other teeth.

About the beginning of 1898 she had a severe attack of acute articular rheumatism, localized in the knees. On recovering she experienced an itching sensation in the sub-mental region. About a week afterward decided inflammatory symptoms had developed

under the chin, and after the application of a poultice, as advised by a druggist, a tumor of the hardness of a green apple developed and invaded the symphysis. A month later a physician was consulted, who made an incision under the chin and evacuated a small quantity of pus. The tumor diminished, although suppuration continued.

After a fortnight only a small, scabby sore remained behind the inferior border of the lower jaw, one-half a centimeter to the right of the symphysis, from which there was a constant slight suppuration. This discharge increased little by little, and nine months after the incision (in January, 1899) the fistula produced a thick yellowish and blood-mixed pus. Several surgeons of hospitals and dispensaries were consulted, and cauterizations with silver nitrate were tried without success. Tincture of iodine injections produced a reaction, causing swellings and suppuration.

A surgeon of one of the Paris hospitals made an incision and thoroughly scraped the bone, which he cauterized with silver nitrate and applied wet dressing, but without success.

On the 27th of October Miss T. was admitted into Professor Tuffier's surgical ward at the Lariboisière, and then to the oral clinic of M. Rodier at the same hospital.

The examination of the patient gave the following results:

There was a scab one centimeter wide under the chin, at about eight millimeters to the right of the symphysis and a little behind the inferior edge of the lower jaw. A slight fluctuation was felt under the scab, and by pressure about half a cubic centimeter of pus oozed out.

All the lower teeth seemed sound with the exception of the two central incisors, which had the peculiar blue-gray shade characteristic of dead teeth. The thermo-cautery proved the insensitivity of the teeth to heat, and the same instrument used as a luminous point showed the lack of transparency.

The fistula was doubtless caused by one of the dead incisors, probably the right one, as the opening was at the right of the symphysis.

I opened the canal from the labial surface of the tooth, and washed out the dark, bad-smelling *débris* by the use of peroxid of hydrogen, and afterward vaporized in the canal a few drops of formalin by the aid of boiled water forced into the root with a Strauss syringe and out through the fistula. This was followed by an injection of one cubic centimeter of carbolic acid, and a cotton dressing was left in the canal. The next day the fistula discharged a little, but three days afterward, when the patient came to the hospital, only a trace of pus was found.

The same treatment was repeated, and a paste of zinc oxid mixed with equal parts of formalin and carbolic was put in the canal and the tooth stopped with gutta-percha. Four days later, November 3, there was only a little superficial discharge. On November 6 the discharge was still less, and the sore was beginning to heal.

On November 13th some discharge had reappeared.

February 15th the patient had another attack of rheumatism.

She had not been seen for three and one-half months. Still slight suppuration, but much less than before our treatment was instituted.

The gutta-percha was removed, and the cotton underneath had no bad odor. Five cubic centimeters of boiled water and two cubic centimeters of pure carbolic acid were forced through the fistula and went out in a jet, which indicated the fistulous tract to be much smaller than at the time of the first injections. Eight days afterward the fistula had not suppurated, and was entirely cicatrized.

Now, after six months, there has been no return of the trouble. There remains now only to remove the cicatrix, which is adherent, and to treat the dead left lateral in order to avoid an analogous accident. I shall take advantage of this operation on the other dead tooth to make the bacteriological examination of the pulp cadaver which is now sealed in that tooth.

This case is interesting on account of—

1. The cause of the fistula being a *dead tooth* without caries, the diagnosis of which was only possible by the educated eye of a dentist.

2. The cause of death of the pulp, which was produced by a traumatism undoubtedly received during an epileptiform attack, either by the shock received at the time of the breaking of the crowns of the upper teeth or by violent grinding of the teeth.

3. The cause of the secondary infection, which occurred at the end of an attack of acute articular rheumatism, probably eight years after the traumatism which caused the death of the pulp.

4. The uselessness of preceding surgical treatments.

5. The treatment which cured the fistula and saved the tooth.

SOME MECHANICAL PROBLEMS INVOLVED IN TOOTH-DESTRUCTION AND TOOTH-SALVATION.

BY WILLIAM H. TRUEMAN, D.D.S., PHILADELPHIA, PA.

(Read before the union meeting of the District of Columbia Dental Society and the Maryland State Dental Association, May 16, 1901.)

MANY and complex are the mechanical problems involved in tooth-destruction and tooth-salvation. Some have been exhaustively studied; others, I am impressed, have not received the attention their importance merits. To these I ask your attention.

The most general and the most active mechanical causes of tooth-destruction are those incident to their use. Nature has designed with wonderful foresight and ingenuity the masticating apparatus of all beings to whom it is important, not only in adapting it to the special service it is required to perform, but also in providing means for maintaining its efficiency. In some cases she has provided against loss of the more exposed parts by a reserve; in others a constant growth replaces the tissue lost by wear and tear, and, in all, the form and arrangement of its several parts and the character and disposition of its tissues are wonderfully well adapted to serve

the intended purpose. It was evidently nature's plan that these useful organs we are now considering, which form so important a part of the masticating apparatus, should endure and continue efficient for the entire lifetime of the individual. Where nature rules, this is always the case.

Where they are the chief means of defense or an essential in procuring food, the life of the individual depends upon the efficiency of the teeth, so that necessarily their loss means death. That it is not universally so in the human is due to a change of environment. The civilized races have learned to hold their own with their fellows and procure a sufficiency of food by other means than tooth and nail. As a result of this many live that otherwise would die, weaklings perpetuate their kind to the detriment of the race, and it has come to pass that a man's life is no longer measured by the endurance of his teeth. The teeth are thus placed, in many cases, at a decided disadvantage. While they partake, naturally, of all inherited weaknesses, and are therefore unfitted for long endurance, on the other hand, the stress upon vitality being far less under these new conditions, life is more prolonged than it otherwise would be. Thus the teeth are worn out long before the individual's vitality has been seriously impaired.

Notwithstanding that the teeth are provided with a protective covering of exceeding hardness, the time comes when from constant use they suffer a very great diminution of bulk. While this is not all purely mechanical, it is justly to be regarded as a mechanical cause of tooth-destruction. Where all is normal, where this loss of tooth-tissue is evenly distributed and measured by advancing years, we can hardly consider it tooth-destruction. It is simply natural wear and tear. When, however, it becomes rapid, when it is uneven and changes the normal relation of the occlusal surfaces, it is as truly tooth-destruction as is caries, and is far more unmanageable. It may at times tend to one side of the mouth only, or be accompanied by a protrusion of the mandible. In either case the injury is greater than the mere loss of tooth-substance, and more difficult to repair than an actual loss of the teeth. While, as the result of this, the occlusal line may be very uneven, as a rule all the occlusal surfaces are in contact, so that but little can be done by building up the teeth that have suffered most. The only remedy usually calls for an operation so extensive and expensive that either the patient's nerves or pocket-book are unequal to the task.

These cases are an interesting study. We have a blending of two destructive agencies,—abrasion and erosion; so closely at times, indeed, are the two associated that it is difficult, if possible, to determine their bounds or to say which is primal; far more so to declare the cause and to find a remedy. Some cases seem to be purely erosion, others purely mechanical. The peculiar form this loss of tooth-substance takes is determined at times by the occlusion. A so-called edge-to-edge articulation is more favorable to its occurrence, possibly on account of the greater freedom of side motion this form of occlusion permits and partly, it may be, owing to the anatomical peculiarities usually associated with it. When there is

much overbite this loss is usually less, but not always so. In some cases of marked overbite from force of habit the anterior teeth are made to assume an edge-to-edge occlusion, in which the posterior teeth do not participate, and as a result the anterior teeth are excessively worn.

In other cases of overbite we note excessive wear upon the palatal surfaces of the upper anterior teeth. In extreme cases, seemingly accompanied by a protrusion of the mandible, the crowns of these teeth may be utterly destroyed. We look for excessive wear of the anterior teeth when they are compelled to bear unaided the stress of mastication on account of the loss of the molars and bicuspid, and when the forward thrust of the opposing teeth is not restrained by their interlocking cusps (those of the molars and bicuspid). The changes this wearing down of the teeth may produce are at times very great. When we examine the mechanical construction of the mandible, and remember the changes it undergoes as the individual passes from infancy to youth and from youth to age, and further remember that it carries upon its forward upper border the lower denture, we see a cause for this. It is not at all uncommon to find the cusps of the molars entirely worn off by the time man reaches middle life. This entails, of course, a much greater movement, a closer approach of the forward portion of the maxilla and the mandible, and from the peculiar form of the latter, even if there be no change in the angle between the body of the bone and its rami, this is accompanied by a protrusion of the lower incisors. Their occlusal edges are brought more forcefully against the palatal surfaces of the upper teeth, and whereas they formerly merely touched, there now is a rubbing together. As a natural result there is brought about a close fitting together of all the surfaces in occlusion. This tends, when the jaws are at rest, to hold between these surfaces the oral secretions, and we have upon these occlusal surfaces a condition of affairs favoring erosion, which still further and far more rapidly brings about destruction of tooth-tissue. We find in this an explanation why some fillings fail. When they were inserted, every care may have been taken to secure them firmly in position and to guard against undue stress. As time passes, and changes such as we are now considering occur, especially if occlusal erosion sets in, let us see what may take place. If there is nothing more than a mechanical wearing away of tooth-tissue, a thoroughly impacted gold filling will for a long time securely hold its place. It will wear down as the tooth does, provided the stress upon it is equally distributed and its form and bulk enable it to resist forging out and buckling up. If the stress is, however, uneven, we may look for a change of form and its dislodgment. When this wearing is complicated with erosion we have a different condition of affairs. Erosion acts upon tooth-tissue alone, and far more rapidly than does mechanical wear upon the surface of a solid gold filling. Not only is the gold left standing out from the surface of the tooth, but the erosion is apt to penetrate at the margins of the filling. The stress of occlusion under these circumstances is concentrated upon the filling; it may break up; it may be torn from its position, or it

may, and not infrequently does, so change in form as to fracture the tooth.

Observation of cases such as here suggested has led me to deprecate extended cutting away of tooth-tissue in the effort to make so-called permanent work. I have seen many cases where time has proved that such extension is unnecessary, and many where time has proved that it has been destructive. It is very plausible, the idea of replacing a tissue liable to decay by a substance indestructible; but is it so? May we not in avoiding one evil invite a greater?

When the invitation to prepare this paper reached me I had just examined a mouth in which thirty years ago I placed five gold fillings upon the approximal surfaces of the upper incisors. The cavities were moderate in size, near the gum line, and were filled from the palatal surface (*DENTAL COSMOS*, vol. xv, January, 1873, pages 31 and 32). They have proved effective. What a change has taken place in that mouth! Thirty years ago those fillings were just clear of the gum line; to-day they are dangerously near the occlusal edge. It is such a case as would have supported the theory of migratory fillings, discussed a few years ago. Concurrent with the wearing away of the occlusal edges of the upper incisors, there has been a passive gum recession, so that while there has been an extensive loss of tooth-tissue, the visible shortening of the teeth is hardly noticeable. In this case, when the worst comes to the worst and the fillings are lost by the breaking away of their occlusal margins, as they will be if the patient lives long enough, the probabilities are that refilling will not be necessary; a little polishing of the margins of so much of the cavities as are then left will be all that is needful. Had these cavities been prepared and filled by methods now so earnestly advocated, I question seriously if the fillings would have so long remained. I am very confident that mechanical stress would long ago have seriously taxed their integrity, and that their loss would have been accompanied by a breaking down of tooth-tissue very difficult to replace.

This case, so suggestive and so typical, determined the title and the character of the present paper. There is far more in the mechanical problems of tooth-destruction and tooth-repair than is embraced in cavity preparation and filling-retention. It is important to consider probable changes the years may bring when planning tooth-repair. There is a choice upon purely mechanical grounds; for instance, between the labial and the palatal wall of approximal cavities of anterior teeth, when one or the other must be sacrificed. The palatal wall is always an extension beyond the base; is often an isolated pillar of enamel, and far more liable to injury than is the labial wall. Under normal conditions of wear it far more frequently succumbs, and its loss is far less serious and more readily repaired.

While it is commendable to always aim for permanent work in repairing injuries to the teeth, it is wise to remember that the teeth themselves are subject to change, and to so plan our work that while it arrests caries and replaces, as far as may be, lost tissue, it shall not itself become destructive.

There is room for wise discretion as to whether or not frail walls shall be retained,—whether it is best to anticipate possible fracture and replace them by a filling supposed to be stronger, or to retain them as a protective covering to a filling fully competent to arrest caries but otherwise unable to hold its own against mechanical stress or chemical disintegration. This is purely a mechanical problem.

We know that enamel unsupported by dentin is exceedingly frail. We know that certain structural forms are stronger than others, and that the endurance of a weak wall depends upon its position. We know that a small filling is less exposed to stress than is a large one; that a filling upon an approximal surface requires less anchorage than does one encroaching upon the occlusal surface. We know that some filling-materials are more readily applied than others; some require for their retention more anchorage than do others, and we further know regarding this that it is not so much the amount of sound dentin removed from a tooth that weakens it as it is the position from which it has been removed. This is all pure mechanics. Now the practical application.

Select an approximal cavity upon a bicuspid tooth, one of a kind so frequently met with, situated just below the point of contact, a small opening leading to a large cavity undermining the approximo-occlusal edge. What do we know regarding this? We know that a destructive agent has at this point penetrated the enamel; that it has extensively destroyed the dentin, and we know from frequently repeated observations that its action upon the enamel will be very slight. The increasing risk to the enamel over that cavity is due mainly to an increasing loss of its supporting dentin. If we can arrest the destruction going on within and restore to that enamel the support of which it has been deprived, shall we not in many cases have made the best possible repair?

The enamel which has resisted so well the destructive agents from without and those actively at work within can surely be depended upon to still continue to do so after the filling has been inserted, if the filling is a protective one. Making the filling protective is a mechanical problem. The safety of the occlusal edge depends upon the support permitted to remain. If in preparing the cavity so much of the enamel is cut away as to leave it a mere bridge, it is seriously compromised. If, on the contrary, the opening to the cavity can be kept small and a considerable portion of the enamel be retained, it has a very fair chance. It is a mechanical problem to remove the affected tissue with the least loss of that which is sound, and to select a filling-material that can be made to thoroughly fill the cavity and effectively close its entrance.

The question is often asked, Why is it that gutta-percha arrests decay so perfectly in cases where gold does not? Why is non-cohesive gold more preservative than cohesive? They possess no specific virtue. The problem is purely a mechanical one. A gold filling, at its best, is like a cork in a bottle. In using non-cohesive gold, we place layer upon layer parallel with the walls of the cavity; a smooth sheet or mat of gold is presented to the walls of the cavity

in the best possible condition, and in the best possible position to make a close fit. The manipulation it receives has but little tendency to temper it; it remains soft and pliable. Cohesive gold, no matter how it is packed, covers the walls of the cavity little by little, and under the plugger-point manipulation quickly loses the softness and adaptability imparted by annealing. Each morsel added is independently packed in place; is bent and creased, twisted and crushed, and is forced to contact with the cavity-walls by being especially driven there. Each piece added is an added opportunity for overlapping, balling up, bridging over, and in a thousand and one ways forming minute defects. With the true plastics, the cements and gutta-percha, we have more than a close fit; we have an actual adhesion. This answers the question: It is a mechanical problem.

So far as arresting decay is concerned, so far as assuring immunity from recurring decay along cavity margins is concerned, that filling is best that most nearly fills the cavity and approaches nearest to perfectly sealing its entrance. Gutta-percha can be made to accomplish both essentials far more readily than can gold, and on that account is a better tooth-saver. It is a mechanical problem.

The mechanical problems of tooth-destruction require close study in order that we may successfully solve the mechanical problems of tooth-salvation.

COMBINATION SPLINT AND BRIDGE-WORK IN THE TREATMENT OF PYORRHEA ALVEOLARIS.

BY DR. W. L. FISH, NEWARK, N. J.

(Read before the union meeting of the District of Columbia Dental Society and the Maryland State Dental Association, May 16, 1901.)

MR. PRESIDENT AND GENTLEMEN: It is with a certain amount of hesitancy that I present this subject to-day, knowing full well that it covers ground explored by some of the greatest minds of our profession, and subjects that have long ago ceased to be of interest to a dental convention; but it is in the combination of the various operations and devices set forth and the splendid results attained that I feel certain you will be interested.

The cases I wish to present for your consideration I will illustrate by a model,—not of the exact dentures, but made to represent as nearly as possible the conditions existing in the two cases. Their clinical history, before being placed in my hands, was given me by Dr. G. Lenox Curtis, of New York city, to whom credit is due for the surgical portion of the operations forming the groundwork and contributing to the ultimate success. Without this thorough work by Dr. Curtis the subsequent operations would have availed nothing, and without a perfect splint the surgical work would have been useless. By the combination of the two we have produced results that, to my mind, are simply wonderful. The history of the cases is as follows:

Mrs. A. for many years had suffered from diseased gums and alveolar abscesses. From time to time teeth were extracted; the

breath was offensive, and the mouth upon arising in the morning exceedingly foul. It was only after strong germicidal measures had been taken that an examination could be made, when the following conditions were found to exist: A general pyorrheic condition throughout the mouth; several pulpless teeth and a number of abscesses; interdental process generally destroyed, and the probe could be passed beyond the apex of many teeth; superior centrals and laterals elongated about one-quarter of an inch; the gums hypertrophied and baggy; pus oozing from about many teeth, and even where the teeth had been extracted at different times the sockets were filled with ulcerating tissue.

The case, after having been treated by the Curtis method (see *New York Medical Journal*, January 14, 1899) and the centrals extracted and reimplanted, was turned over to me for the application of a splint.

In the second case, Mrs. B., the examination of the mouth showed a general condition of pyorrhea alveolaris; and while many of the teeth were extremely loose, there was no free discharge of pus, and the only firm tissue remaining was at the apex of the roots, which alone held the teeth in place. The upper six front teeth had been crowded forward by reason of the disease until they did not occlude by one-eighth of an inch. Of the upper set, the third molars alone remained in place and were but slightly affected by the disease.

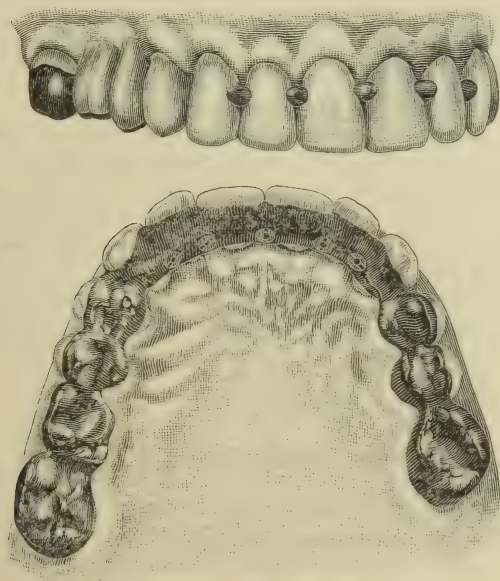
You will readily perceive that the foregoing cases were of the worst type that we are called upon to treat, and such as we treat only in cases where extreme pride prompts the patient to undergo the severe ordeal rather than submit to extraction. I cannot say that I was overjoyed upon seeing these patients present themselves at my office with mouths full of sore and loose teeth, held in place by silk ligatures to prevent their falling out, and with a polite note asking that I apply a splint.

In the case of Mrs. A. the centrals had been extracted and replanted, the sockets having been deepened, and with the neighboring teeth firmly ligated. The right first bicuspid and first molar and left first molar had been extracted. In the case of Mrs. B. the first and second molars on both sides had to be extracted. The model I pass around will serve to illustrate both cases, the practical application being the same.

The first and probably the most important operation, after having accurately placed the teeth by silk ligatures, is the impression, and this must be absolutely perfect and at all times taken in sections and in plaster. In case of front teeth, the plaster should be mixed soft and carried well up around the palatal surface of the teeth. After it has hardened, remove and trim, soap well and return to position, when the labial impression may be taken in the ordinary tray. When the model is run you will have an absolutely perfect counterpart of your teeth, including the ligatures, the impression of which must be carefully removed. This model should take in the six front teeth only, and upon it must be constructed the splint. My method is as follows:

Take pure platinum, about No. 36 standard wire gauge, and burnish perfectly to the palatal portion of the teeth; after adapting the same, trim so as not to encroach too near the gum, extending to the cutting-edge. A piece of No. 25 gauge platinum-iridium about three-sixteenths of an inch wide is formed to fit this backing, extending around each canine to a point equal to the center line of the tooth. This and the thin platinum backing are waxed and carefully removed, when they may be soldered lightly at first, returned to the model and burnished, when they may again be removed and the little triangles and spaces between band and backing filled with 22-karat solder.

The finished bar must now be drilled and reamed with the Bryant reamer to admit the nut upon the small wedges. The wedges are



made by burnishing a piece of pure platinum, same gauge as the backing, on the splint, in the center of which a pinhole has been punched, to each individual space between the teeth. A pure platinum wire is cut to pass between the teeth, allowing length enough to pass through the splint. Upon one end a thread is cut to receive the small Bryant nut. The wire is now forced into an asbestos block, threaded end first, until a small portion remains exposed. Over this end is placed the head-piece, and pure gold is flowed into the same, uniting bolt and head. This is now finished to suit the case.

The splint for the bicuspid are made to cover approximal palatal and grinding surface, a small pin being soldered in the center of each which fits into a corresponding hole drilled in the center of the tooth. This, when in place, prevents any possible chance of the tooth moving outward. The anchorage for the ends of bridges are

simple caps, extending just beyond the large diameter tooth. In no case must any part of the device encroach upon the soft tissues, in order to prevent the possibility of food accumulation.

When the numerous caps and splints are ready, they are placed in position, and, if necessary, ligated to keep the teeth in exact position. Bites are now taken for those portions of the bridges where dummies are to be placed, after which an impression of the combination is taken. In this instance it is only necessary to have impression of palatal surface of front teeth. All parts are removed and placed in the impression, where they are treated as is usual in crown- and bridge-work. In soldering it is necessary to have every piece of metal touch its neighbor to preclude shrinkage; should spaces exist, fill in the same with small pieces of plate before soldering. Do not be sparing of solder, it being always wise to err in the line of strength. When setting the device apply the rubber dam. In applying the little nuts to the wedge bolts, I use a small screwdriver made from an old right-angle hand-piece. This enables me to work in the smallest possible space.

The results obtained in these cases have been all that could be desired. The two teeth that were replanted have become thoroughly united; the gums around the teeth in both cases are in a perfect state of health, and with the bridges articulating with the lower teeth the patients are enabled to thoroughly masticate their food; and it has been years since either of them have enjoyed such perfect health. Both patients have been seen within the past few days, and the teeth and gums in both cases are in excellent shape.

IDEALS, OLD AND NEW, AND THE REFLEX VALUE OF WORK.

BY EDWARD C. KIRK, D.D.S., PHILADELPHIA, PA.

(Baccalaureate address to the graduating class of the Dental Department, Northwestern University, Chicago, May 2, 1901.)

You will remember that Macbeth, returning victorious from his conflict with the enemies of King Duncan, encounters the ghostly witches who forecast his future, and he afterward relates the adventure to his wife in a letter, saying, "They met me in the day of success, . . . and whiles I stood rapt in the wonder of it came missives from the King, who all-hailed me Thane of Cawdor, and referred me to the coming on of time with 'Hail, King that shalt be.'"

The ceremony just concluded, by which your alma mater has conferred upon you the mark of her approval, bears public witness that you are the victors in a test of the abilities which for three years you have been training to attain the reward which is now yours. To those of us who know by experience and by observation what the struggle means, what it has cost, how much of hard, earnest work has been expended in the endeavor, it seems fitting that we should "all-hail" you as victors in the day of your success.

But dare we do more? Will the circumstances which hedge about the professional pathway you have thus far trod justify the spirit of prophecy in saluting you with "Hail, kings that shall be!"?

It was but yesterday that dentistry was an empirical art; to-day it finds itself developing in the higher environment of a scientific profession. The transition has come about so quickly that those of the present generation have witnessed the advent of our profession into the ranks of the specialties which make up the sum of medical science and art.

The scholastic training of the dentist is embraced in a period of but little more than half a century, and it is well within the limits of the latter half of that period that empiricism in dental education gradually began to feel the inevitable results of scientific research and give way to rational methods of training and practice. With the introduction of laboratory methods of study, the old systems of education in all branches of the healing art have been shaken to their foundations; scientific methods have supplanted the speculative features of the older system, and in our modern method of instruction the laboratory and seminar have relegated to a subordinate position the didactic lecture as a means of instruction. More efficient teaching, demonstration, not words, have become characteristic of our latter-day methods, and the result is an improvement not only in the training of our graduates as practitioners, but in their ability as students.

We stand to-day between the old and the new in professional development; the present is peculiarly a transitional period in dentistry, and to you who are making your advent into the professional ranks,—you who, while looking hopefully toward the future, are even yet so close to the past as to feel the influence of its fading traditions, it is of more than passing significance that you consider carefully the professional environment into which you have been born, and determine if you can the conditions which it will be your part to fulfill if we are to indeed hail you "kings that shall be!"

Go back in memory a few moments to the day when you presented yourselves as applicants for matriculation in the freshman class of your alma mater,—try to realize your conception of dentistry at that time, and, having done so, compare it with your present ideas on that subject. Have not three years of college experience wrought a change in your earlier ideals of your profession? Before studying the subject, you probably thought that dentistry comprised the operative and prosthetic departments of dental art. If your ideal was more extensive than that, it was above the average. But your experience broadened, not without a corresponding shock of surprise, when you discovered that in order to fit yourself creditably for the practice of your chosen calling an extensive training in all of the fundamental medical branches was required of you,—chemistry, anatomy, histology, physiology, pathology, bacteriology, surgery, and materia medica,—in addition to those branches which I doubt not you regarded as the "practical dental subjects." And you found also that a smattering of scientific medical knowledge would not be sufficient,—that success was to be

attained only by continuous, assiduous, thorough work. You rebelled perhaps; your idéal was shattered. What had all this to do with dentistry,—the dentistry which you wanted to secure the right to practice?

As the pursuit of your studies brought you into contact with the broader relationships of your professional work, and as its scientific basis was gradually developed in your minds, your primitive ideal was replaced by a new one, an ideal which raised your chosen vocation to the dignity of a scientific profession instead of an empirical handicraft. You discovered that the popular conception of dentistry with which you entered college was the dentistry of the past, while your new ideal was the dentistry of the future, of science as opposed to empiricism. How, then, we may ask, have you responded to this new conception? Has the impulse of the new idea given an impetus and direction to your professional training, in so far as you yourselves are responsible for that result? It has been the motive power of the educational system through which you have successfully passed and the vitalizing principle of those who have directed your professional training; but that is only part, aye, and a minor part, of the educational process.

In these days of predigested foods, of anesthetics, of labor-, pain-, and time-saving devices in every department of human life, even the labor of thinking has come to be regarded as onerous, so that predigested knowledge and short cuts to education are offered in response to a demand for relief from the labor of individual thinking and mental self-culture. The highway of knowledge is one over which the individual must travel by his own effort; the teacher is, at best, but a guide familiar with its difficulties and obstacles, and is useful only in so far as he is competent to point out the best means for surmounting them. The teacher may direct the journey, but cannot carry the traveler; it is the student who must do the marching if he would attain the haven where he would be.

And what is the haven toward the attainment of which you have been exerting your efforts? The question may seem less difficult to answer than those which you have recently solved in your examination for the degree just conferred upon you. But is it for that end you have labored,—merely to gain the right to practice dentistry in order that you may procure as the reward of your labors the means of subsistence and a few of the luxuries of life? Have you no hopes nor aspirations beyond that? Sooner or later it dawns upon every human mind capable of logical reasoning that the mere acquisition of material things will not satisfy that craving for happiness and peace which is a factor in all human life, and which the poet Browning has called the "joy hunger." One after another, our quests for happiness in the acquisition of material things, be they wealth, property, or effects of whatever character, leave us disappointed when once attained, and we are unceasingly, relentlessly urged onward in the search for that satisfying joy which our lives demand and which will not be silenced nor diverted from its true object.

Perhaps your college experience has already discovered to you one of the means by which a lasting happiness may be attained, and by that I mean the happiness resulting from honest, careful, thorough, and intelligent work. Let us, for the sake of clearness, make a distinction at this point between work and labor. The difference is largely one of motive or the mental attitude with which we undertake a given task. It was the clear perception of the modifying effect of one's mental attitude toward work which enabled Mark Twain's immortal character, Tom Sawyer, to not only convert the task of whitewashing his grandmother's garden fence into a pleasant recreation, but by impressing his companions with the same idea, to make the work a source of considerable personal profit by sub-letting to them the privilege of doing the whitewashing for him.

As we have here limited the terms, we are safe in asserting that work and labor are by no means interchangeable as to their meaning. It is not work that kills nor is irksome nor soul-destroying, but labor without motive or reward. But I would not have you understand that work intelligently conceived and earnestly carried out is simply tolerable, a sort of negative quantity in our lives, which can be endured for the material results that it brings to us in compensation for the energy expended upon it. Rather would I impress upon your minds the belief that in work intelligently conceived and earnestly carried out you will find the sources of your greatest happiness; if not directly, at least indirectly, by the certainty and directness with which such work as I have referred to develops those elements of character by which alone you are made capable of being happy.

Your work must be *congenial* to you if you would derive from it all the good that it can confer. Uncongenial work is labor, and should be avoided in the choice of a vocation. The ordinary conduct of life brings with its experiences enough of the uncongenial sort, so that as a means of spiritual discipline it is perhaps unnecessary to deliberately seek them. Congenial work is that adapted to our abilities and to our liking, and I take it for granted that in choosing for yourselves the vocation of dentistry your selection has been guided by your natural abilities with respect to dental professional work and by your liking for it. It has been said that a mere liking for dentistry is not a sufficient reason for choosing it as a life calling; and while it may be admitted that a mere liking for it, unsupported by natural aptitude, would make a questionable basis for its selection as a life-work, there is, I think, too little weight given to the factor of one's likes and dislikes as governing their choice of a pursuit in life. We like the things that are sources of pleasure to us, and our happiness is the outgrowth of doing what, all things considered, gives us pleasure. The psychologists tell us that it is the highest pleasure of an organism to exercise its function. Whatever the organism can do best, that it does most, because it finds therein the most happiness. A huge draft-horse delights in the exercise of its enormously developed muscular power, but would suffer tortures if urged to an exhibition of

speed; or, conversely, the race-horse trained to abnormal fleetness would be physically ruined if required to perform the labor of the draft animal, yet the pleasure which the race-horse finds in contests of speed is proverbial. The natural gift of a fine vocal apparatus leads the possessor thereof to exercise his ability to produce attractive music; he sings because he can sing and finds happiness in singing,—an exercise of function which the tone-deaf individual looks upon as a waste of energy and often as a nuisance. It is, then, the ability to do which makes possible the joy of doing.

Has your college experience developed in your minds an appreciation of the happiness to be derived from work for its own sake? Think of the disappointments which followed upon some of your early attempts to perform the technical operations which formed part of your professional training. The dismal failure of your efforts was discouraging enough to make you seriously consider giving up the attempt to become qualified practitioners. Your subsequent efforts, however, brought more encouraging results, until by patient industry the hiatus between your beginnings and the ideal standard prescribed for you was closed. You will doubtless do better work as your experience widens, but I am sure that the triumphant happiness which came with your first successful achievement will scarcely be duplicated. A new power was born in you by the act there consummated and a new realization of happiness, that happiness which Goethe has called the creative joy, was discovered by you, the demand for which will forever drive you onward and upward in your endeavor to satisfy it; a need in your existence never pacified except by the contemplation of a creation perfect of its kind.

Can you not see that sordid considerations must be relegated to a subordinate place in a mind animated by the ideal of work for its own sake? The reward of your work so performed is a double one: First, in the satisfaction, the happiness, which comes to you as the author of a successful result; secondly, in the sympathetic appreciation of those whom your ministrations serve. It is the touchstone of successful professional practice, and the "open sesame" as well to success as the world defines success. The practitioner who has failed to discover the source of happiness involved in the successful doing of his work loses more than half his reward, whatever remuneration he may receive for his efforts. Let it be clearly understood that the ability to draw happiness from one's work is not a full-fledged natural endowment, but rather the result of character development. To most of you your college career represents one of the most important experiences of your lives; important not so much in what it has given to you of professional training, but by the degree to which it has developed personal character. To the greater number, those of you who entered upon professional study at once after the completion of the elementary school preparation, it meant the temporary severance of home ties and those influences with which the home, the family, and the preparatory school surrounded and protected you in the early formative stage of your lives. You were transferred from an

environment upon which you instinctively depended for guidance in the conduct and management of your vital needs to an environment wherein you yourselves were obliged to assume the directive management of those personal affairs which formerly were relegated to others. It was the change from dependence to self-reliance. No transitional period in human life is more critical; there is none which presents more difficult problems for individual solution, but none also is so potent as a builder of character. Just in proportion as a man is self-reliant with respect to the function which he is called upon to perform in life has he developed his power as a worker, using that term to cover all of his activities, be they physical or intellectual.

But true self-reliance must be rooted deeply in the foundations of character if it is to be depended upon to serve us in all of the exigencies of life; it is but superficial if that which your college career has developed is no more than adequate to serve you in the performance of your technical professional work. The daily routine of college work, the systematic study, the training of your manipulative ability in the repeated performance of operations demanding precision, gentleness, care, and delicacy of touch, with wise discrimination as to plan and method; the patient surmounting of obstacles, the enforced development of a courteous and sympathetic attitude toward those placed in your charge for the relief of suffering, the necessity for tolerance and good-fellowship which your social relationship to a large class of colleagues has imposed, are all factors in your professional education which have given you something more than was announced in the curriculum of studies, but which, notwithstanding their lack of formal recognition as part of your college training, have served to educate your patience, accuracy, close observation, self-denial, firmness, and precision, all of which are fundamental elements of character, and without which self-reliance and success are impossible. It is the possession of these fundamental qualities as the motive forces behind your professional training that raises the art of your calling above the level of artisanship, for, as some one has truly said, the artist constantly strives to perfect his work; the artisan strives to get through it.

Assuming that you have grasped the full meaning of your college training; that you go out from your alma mater having fully developed the faculties which her stimulating influences have warmed into active life, what are the problems upon the solution of which your energies are to be exerted? The professional field in which you are ready to assume an active sphere of work is undergoing rapid development. As has been already intimated, the change of dentistry from the status of a mechanic art to that of a scientific profession has come about within the memory of those now living. The growth of dental art has been so complete, especially in America, as to have reached a point where it is difficult to conceive of the necessity for its development much farther. Its results, its possibilities of adaptation to all human needs in restorative dental treatment seem to be practically unlimited, and the

ingenuity and skill expended in this department of our professional work have excited unusual admiration and unstinted praise. The criticism has, however, been made, and it would seem with some degree of justice, that while wonderfully ingenious and skillful in patching up defective dental organs, we have as yet done but little from the preventive or prophylactic standpoint,—that in the performance of our mechanically restorative operations we have lost sight of the therapeutic phase of the question. It is the practical recognition of the importance of this question which has wrought the changes in our system of dental education, as a result of which we are sending a new type of graduate into the profession, a class of practitioners who will refute the criticism that dentistry is a mechanic art, and who will demonstrate its therapeutic importance by practicing it as a specialty of medicine. The circumstances influencing the early history of dentistry led to its development as a profession upon a basis independent of medicine and the creation of its own sources of education, with the result that the study of the mouth and its disorders was neglected by the medical schools and the subject was relegated entirely to the care of those who had assumed that field of study and practice. It soon became evident that the ability to successfully restore defective teeth to a condition of comfort and usefulness was but a minor part of the requirement necessary for the practice of all that was properly included in the sphere of dental science and art. Diseases of the mouth and its contained organs were found to be intimately related to the functioning of the whole bodily economy. Not only were diseases of the mouth found to be the cause of disease in remote organs, but, conversely, it was found that general diseases often exhibited characteristic lesions in the mouth.

The flood of light thrown upon the cause of disease by the work of Pasteur in France and the epoch-making researches of Koch in Germany gave an impetus to the study of general pathology which has not only wrought a revolution in our knowledge of disease, but has created the science of therapeutics. Dentistry early felt the vitalizing effect of the new idea. The meaning and consequences of bacterial action in the human mouth were unfolded by the work of Miller and others, until the true cause of dental caries was formulated for the first time in 1882. Other disease problems furnished by the action of bacteria in the human mouth have received and are receiving their share of attention, with the result that the necessity for a thorough training in bacteriology and bacterial pathology has become an essential feature of dental education. A correct conception of the practical importance of these fundamental scientific studies in their relation to dental practice is essential to success as a practitioner. The failure to regard such knowledge as a necessary feature of the mental workshop makes the distinction between the dental artisan and the scientific dental practitioner. The new era in dentistry which was born with the advent of scientific laboratory research, while it has been already productive of brilliant results which have reduced to a certainty the treatment of a number of diseases and has given lasting fame to those who

were instrumental in solving the problems which they presented, is only in its infancy; the results already attained are but little more than suggestive of still greater achievements for the future.

The concentration of attention upon the natural phenomena of diseases, their causes and cure, has until recently led to the neglect of the study of that other and equally important natural phenomenon,—namely, good health. The fact that a large number of diseases are caused by germs has become a matter of common knowledge, and with that conception the popular deduction from the therapeutic standpoint has been hastily made that if germs cause disease, all germs must be harmful; therefore, in order to prevent or cure disease we must get rid of the germs which are the cause. But investigation has shown that both the deduction and the major premiss are only partially true. Not only are certain bacteria not harmful, but some of them are, indirectly at least, essential to the existence of animal life; and, furthermore, as bacterial forms are universally distributed,—many of them, in fact, being constant inhabitants of the human mouth, regardless of the hygienic care which it may receive,—the possibility of avoiding the results of their action by treatment directed toward their destruction or exclusion is extremely limited. The problem of immunity from germ action, the problem of good health, in other words, is one which has during the past ten years offered itself for solution, and has opened up a rich field of research. It has already been demonstrated that the healthy living body possesses with itself the means for more or less effectively resisting the invasion of infective agencies; that the bodily tissues and fluids develop in conditions of normal health certain substances capable of destroying in large or smaller numbers the germs which cause disease, and that this germ-destroying quality is a function of the animal body which is developed in a nearly direct ratio to its health status. Or, otherwise stated, good health may be regarded as the natural defensive force of the bodily organism against the invasion of disease.

You will at once perceive the important bearing which this fact has upon the question of hygiene. If we are to successfully combat disease, it must be done by a study and application of the principles of preventive medicine. The study of physiological chemistry, of physiological physics, as well as bacteriology and bacterio-pathology, must be successfully accomplished if we are to refute the criticism which I have already quoted to you, that while we are ingenious repairers and patchers-up of defective teeth, we have as yet done little or nothing to prevent the inroads of dental disease. The dental prophylaxis of the past is that which is represented by antiseptic mouth-washes and powdered pumice-stone on the end of a polishing-stick; the prophylaxis of the future is that which has its foundations already laid in those elements of preventive medicine to which I have referred. Your college course has been too brief to enable you to adequately cover the ground which you must cover in order to successfully solve the problems which will invite your attention in the future; what it has done for most of you, I trust, is to develop the essential elements of character which make

for professional success,—the self-reliance, the love of truth, the love of earnest, persistent endeavor, the love of work for its own sake, and the appreciation of the happiness which comes with the successful result of your endeavors,—in which case we can safely trust you to individually continue the study which will enable you to solve the problems which are awaiting you in your professional lives.

It is each one of you who has imbibed this inspiration from your college life that we may safely hail “king that shalt be!” and to whom I may be pardoned for quoting the closing paragraph of Macbeth’s letter to his wife, by saying, “This I have thought good to deliver to you . . . that thou mightest not lose the dues of rejoicing by being ignorant of what greatness is promised thee; lay it to thy heart, and farewell.”

CORRESPONDENCE.

A REPLY TO DR. THOS. P. HINMAN.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—The writer requests the privilege of replying to the communication of Dr. Thos. P. Hinman, president of the Southern Branch of the National Dental Association, which appeared in the May issue of your journal, entitled “A Reply to Dr. Walker.”

I desire, first, to make some corrections in Dr. Hinman’s statements as to *dates*. Dr. Hinman says: “If he (Dr. Walker) did not have the facts when he wrote,” etc. In justice to myself, I must state that my communication, though appearing in your March issue, was written in Richmond, Va., and sent to the DENTAL COSMOS on the 10th of January, and I received reply, dated January 16th, saying, “Your communication will appear in next issue.” The article, however, like that of Dr. Hinman, appears to have been crowded out, as it did not appear until the March issue, and with no date attached; but that it was put in type in time for the February issue is evidenced by the reprints now in my possession, which bear date January 21st. At the time, therefore, that I received Dr. Hinman’s letter of February 4th, to which he refers, I was in daily anticipation of the receipt of the February DENTAL COSMOS, in which I expected to find my communication, and it was certainly too late then to attempt to keep it out of the February issue.

Dr. Hinman further says: “If he did not have the facts when he wrote, he had them in time to countermand the communication which appeared in the March DENTAL COSMOS.” The “facts” are that, although in Dr. Hinman’s letter which reached me February 6th he said, “The Southern Branch of the National Dental Association will meet at Nashville on Tuesday, July 30th,” a change was announced on the 20th of February, when Dr. Hinman wrote me, “The Southern Branch of the National meets at Nashville on Monday, instead of Tuesday, preceding the National, and if you antici-

pate a funeral you will surely find a lively corpse. Dr. Foster *thinks* [italics mine] he will be able to get the Faculties Association to meet on Friday instead of Thursday." But even at that date the question was not settled, for it was not until the 4th of April that Dr. Foster wrote me, "I am now *prepared to announce* [italics again mine] the meeting of the college faculties for Friday preceding the meeting of the National, instead of Thursday, as per original resolution. This gives the Southern Branch a better opportunity." So much for having the facts at my command, either when my communication was written or when it appeared in the DENTAL COSMOS.

It was in acknowledging receipt of the above letter from Dr. Foster that I wrote him as follows: "Every month lately, when the journals come in, I look to see what announcement is made of our meeting. I find everything but the Southern Branch. "The Nationals" have been announced for some months, and state meetings for June and July without number, and even some for August, but not a word about the Southern Branch. What does it mean? Will you not, as secretary, see to it that the president, with the assistance of the secretaries, gets something into all of the May journals? It costs only the postage, and certainly ought to be done. Yours for the Branch as well as for the National, W. E. W."

The announcement was finally made in the journals, BUT appears in the index of announcements (with the exception of the DENTAL COSMOS only) as "National Dental Association." Note the omission of the essential words "Southern Branch." The date of the meeting of the National Association having been previously announced in earlier issues of all the journals, beginning with the *Items of Interest* in January, a busy man would scarcely take time to turn to the page referred to, and even then the headline of the announcement fails to mention *Southern Branch*. Notices of the meetings of the National Dental Association, as well as that of the National Association of Dental Faculties and that of the National Association of Dental Examiners, have been kept continuously before the profession in all the dental journals. But the earliest mention of the Southern Branch is found in the *Dental Review*, April issue, though not indexed, and appearing only in "Memoranda." No notice of the Branch is to be found in the April issue of either the DENTAL COSMOS, *International Dental Journal*, *Items of Interest*, *Dental Register*, or *Ohio Dental Journal*. Notice is quite generally given in the May journals, but indexed only as "National Dental Association," with the single exception of the DENTAL COSMOS, which adds the words "Southern Branch"; so that the busy man who looks in the index for what he wants to see finds no announcement of the meeting of the Southern Branch of the National Dental Association, even in the May journals, except in the DENTAL COSMOS. Fortunately, however, that journal is so widely read that possibly the omission of the name of the Branch from the announcements in the other journals may be immaterial, but I doubt it.

As to Dr. Hinman's suggestion that I am unnecessarily uneasy

as to the fate of the Southern Branch of the National Dental Association while it is in his hands, I will say that I am glad he feels that my uneasiness is unnecessary, and that he considers the prospects fair for "a very lively gathering." My uneasiness in the matter, as expressed in the letters to which Dr. Hinman refers, was based upon the facts, first, that he as president of the Southern Branch opposed the calling of a meeting at Old Point Comfort for the reception of delegates and collection of dues until it became evident that a meeting would be held with or without call from him, when,—immediately preceding the meeting (June 28),—a postal card was issued to the members of the Branch. This was, of course, useless as far as increasing either the membership or the revenues of the Branch was concerned. Second, that when the called meeting was held the president opposed the reception of new members for the National Dental Association through the Branch. And, third, that during the summer and fall of 1900 he failed, as far as can be learned, to use his influence with the Executive Committee (to whom the selection of time was left) to hold the annual meeting of 1901 in February, as hitherto, at which season very successful meetings had been held in 1898 and 1899, and which would have made his meeting take place only two years later than his election to office. The spring months were allowed to go by, and the meeting has been called for the week preceding that of the National Dental Association, and in the same week as the meetings of the National Associations of College Faculties and of Examining Boards. It seems a little peculiar that it was not "found" earlier that the two bodies would be in session simultaneously. It could have been ascertained at any time by consulting Dr. Foster, whose office adjoins that of Dr. Hinman in the same building, Dr. Foster being the secretary of the Southern Branch and also the chairman of the Executive Committee of the National Association of Dental Faculties.

The facts as pointed out above show, as we think, grounds for uneasiness as to the welfare of the Southern Branch.

Personally, the writer is of the opinion still, as expressed in the article written for the DENTAL COSMOS, under date January 10th, that the Branch meeting should not be held in opposition to that of the National in point of time, but should be held in the winter, as heretofore. Also that it should be so managed as to benefit the National Association by increasing its membership, since all members of the Branch are also members of the National; and also to improve the finances of the National, since three-fifths of the dues of the Branch are sent to the National; and also to enlarge the sphere of usefulness of the National, since the Transactions of the National go into the hands of every member of the Branch, whether they attend the meetings of the former or not.

The finances are increased only through the reception of delegates; delegates are possible only through election by state societies. It would be embarrassing for the president to have no delegates, and consequently no increase of revenue or membership from his meeting, and possibly this explains the failure to hold the meeting

in February, as Dr. Hinman wrote me last year, "No efforts have been made to secure delegates for the Southern Branch, but an effort will be made at each meeting to appoint delegates to the National." There would therefore have been no delegates at a meeting held in February. But at a midsummer meeting he will have the delegates elected by the state societies at the spring meetings (but who properly belong to the next president). Dr. Hinman's letter, from which I have quoted above, was in reply to one from me, in which—having learned that the matter of electing delegates had been overlooked in some state society meetings already held—I wrote to ask him whether it would be attended to in other meetings to be held, having learned from my own experience as president of the Southern Branch the necessity of calling attention to this feature, which is a new one in Southern state societies, so that it seems necessary (and it is done by the National Association also) to call the attention of each state society to the importance of this matter, for only in this way can the membership, and consequently the finances, of the National Association and its Southern Branch be increased.

WM. ERNEST WALKER,
Ex-Pres. So. Br. N. D. A.

PASS CHRISTIAN, MISS., May 17, 1901.

"INFLUX INTO THE DENTAL PROFESSION."

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—There appeared in the December DENTAL COSMOS an article entitled "Methods of Selection in Controlling the Influx into the Dental Profession." This is indeed a remarkable article, and one which makes statements so astounding regarding the methods and practices of dental colleges in their dealings with students that it is very strange no one has called attention to it before.

The paper begins by saying, "There have been many barriers erected by the profession for the purpose of controlling this influx into the dental profession." From our standpoint, this statement is distinctively misleading. So far as the author goes in discussing the so-called barriers of the colleges, he shows them to be of no value in preventing illiterates from entering the schools; in other words, they are farcical and brand those who claim anything for them as dishonest. We are not discussing these barriers from the standpoint of a college professor,—the author of the paper has been kind enough to do that for us,—and shall review them in their order as a matter of information. We shall be able to look at this subject from a standpoint entirely new to many.

First barrier: "*The preliminary requirements*, so called." After a diatribe against a class of men who have criticized what they believe to be wrong in our educational system, the author so far forgets himself as to characterize this spirit of criticism as indiscriminate and ignorant, and, continuing, says that the accusation made against the better colleges, that they admit any and every one, without regard to their qualifications, is maliciously unjust, and

is a result of the shameless ignorance of the facts. After making this declaration, the author, desiring to be honest, even at the expense of being mixed in his statements, says, "On one point the writer must join the chorus of condemnation; that is, the present standard of admission,"—or, in other words, the preliminary requirements; the door by which men enter the profession is practically left wide open. Let us now listen to the point of condemnation, "the present standard of admission," a standard lowered by the Faculties Association, "shamelessly admitting that it was a matter of expediency in order that the attendance might not be cut down." Being no longer able to conceal his disgust, the author remarks, "This is a defenseless defense, for it practically admits the charge so vehemently made against the colleges that they are organized and run on a commercial basis for financial returns."

Further comment would seem unnecessary on this first barrier to the profession,—this screen placed across the stream to strain out the unfit, but for the fact that the author solemnly avers that these requirements are strictly carried out by conscientious and painstaking college men. He says, "The fault is in the low standard, not in the enforcement. The latter is conscientiously executed by all honorable colleges." This would be laughable were it not so serious. The author recommends high-school education and a knowledge of the humanities as being necessary to the full development of the professional man in this day of education and enlightenment. We see no reason why the standard should not be at least a high-school education. Why should our colleges have preliminary requirements that are so low that they must of necessity bring forth inferior practitioners?

Second barrier: "*Freshman and junior finals.*" The paper now advocates progressive examinations to take the place of the freshman and junior finals, but with what assurance that this method would be any more faithfully carried out than the original plan it does not inform us. Let us now look carefully at this barrier, necessarily quoting liberally from the paper. "This method,"—that is, the progressive examinations,—"is practiced to a degree in the final examinations at the end of the first and second years, but there is too much laxity in passing the incompetent at these stages by 'conditioning' them." We understand this "conditioning" to mean simply that a candidate will be passed from a low grade to a higher grade, even if he has failed to make the promotion marks. (This conclusion is reached from the author's statement that work thus passed over is made up in "some fashion.") Again, "Men are allowed year after year to come up and fail when it is well known to their teachers that they can never pass for graduation, and that they could not succeed even if they should attempt practice." We are staggered at this statement, and must read it again to be positive that we comprehend it. Is it possible that such things occur? Are men's time and money deliberately and maliciously stolen? Probably the paper is too hard here; the author, however, must have been in possession of facts. Thus we pass the second barrier to be confronted with a third and more rigid one.

Third barrier: "*The final examinations.*" "The final examinations are too strict, if anything, for the colleges are in such terror of the state boards that the final culling out is very rigid." We notice, however, that the incompetent student is still drifting, and that he continues to drift until he reaches the meshes of the last sieve; with all the money the college can possibly get from him paid over, he is coolly thrown overboard for fear of the state boards. Surely there must be something wrong in the present conduct of the colleges. Some may be entirely free from all blame and perfectly upright in every way. We believe that there are such, and these should constitute a minority to condemn anything that smacks of dishonest practices or standard-lowering. The Faculties Association is making a feint at controlling the conduct of the colleges. Let it be said here that in this organization lies the power to correct most of the evils existing in our educational system. The general profession and the boards are looking to see whether this body will be a blessing or a curse to the profession. In the report of the Committee on Schools of the National Association of Dental Faculties for 1900, the committee reports as follows: "Various rumors have reached your committee of irregularities in securing students,—that some colleges, in order to get students, make concessions in fees, etc., and offer to reduce the fees or to give so much for every student that may be influenced to attend their school, and inducements in other ways that are reprehensible, such as allowing students to hold positions in stores, dental parlors, printing offices, etc., and absenting themselves from lectures and laboratories every other day, and attending lectures when convenient. Your committee have not been able so far to get any positive proof of these irregularities," because no investigation was made, as the committee further states in its report, giving as the reason lack of funds. It is gratifying to notice among the standing resolutions of the Faculties Association one providing for the investigation of such reports and rumors, and also providing funds, so that in the future this lack of funds cannot be offered as an excuse for a failure to investigate such charges.

The fourth barrier mentioned in the paper is: "*The boards.*" One thing is apparent, if the paper is correct, regarding the boards,—namely, that some incompetent men are not allowed to graduate who would otherwise do so. The boards are not perfect; neither may we expect perfection from either the colleges or the boards, but we have a right to expect honesty and fair dealings from both. The recent examination by the United States board for contract dental surgeons is in no manner complimentary to the college graduate. It is only necessary for me to say in conclusion that with the limited acquaintance the members of the boards have with the candidates, with the unfavorable circumstances under which both examiners and candidates labor, it is little wonder that mistakes are made, and sometimes a good man is excluded for a few months or a bad man is licensed; but let those who are without a sin throw a stone. I maintain that it is an everlasting disgrace to the colleges of America that there is a necessity for examining

boards; furthermore, it is believed by not a few American dentists that the same conditions which operated to create the boards in America caused the American diploma to be brought into disrepute in Europe. Much has been said of late about certain diploma mills which have been making a business of selling diplomas to foreigners for a small fee. We are heartily in sympathy with everything that is being done to bring such offenders to justice. The state authorities should suppress such fraud with a firm hand. There is a necessity for house-cleaning in other directions, however, from the number of cheap dental shops in all our American cities and towns, presided over by graduates from so-called reputable institutions. It would seem that the Faculties Association will of necessity require a committee on domestic relations.

State control of dental colleges is touched upon by the paper, but at this time it is most too socialistic to require more than a passing notice. Unless a check of some kind is put upon the indiscriminate (I use this word advisedly) manner in which men are allowed to enter the colleges, it may transpire that the states will control the influx.

H. W. CAMPBELL.

SUFFOLK, VA., May 23, 1901.

PROCEEDINGS OF SOCIETIES.

THIRD INTERNATIONAL DENTAL CONGRESS, PARIS.

(Continued from page 654.)

FOURTH DAY—SATURDAY, AUGUST 11, 1900—*Continued.*

SECTION VIII.—HYGIENE AND PUBLIC DENTAL SERVICES.

THE president, Dr. Poinso, called the meeting to order and announced that a paper by Prof. A. LIMBERG, of St. Petersburg, would be read by Mrs. Limberg, the paper (of which an abstract here follows) being entitled

THE STATE OF THE TEETH OF THE CHILDREN OF RUSSIA.

It has been demonstrated by numerous researches that from seventy-five per cent. to ninety-five per cent. of the children living in large cities suffer from caries. The necessity of caring for the teeth of school-children was pointed out for the first time by Prof. W. W. Sklifosovsky in 1879. According to the information collected by this authority, out of 400 school-children 288 were victims of diseases of the teeth,—that is, about seventy-two per cent. In St. Petersburg it has been observed that eighty per cent. of the inhabitants have faulty teeth; in the departments of the north, sixty-five per cent.; in those of the south, sixty-four per cent.; in those of the west, fifty-eight per cent.

The model study of Prof. Sklifosovsky has given rise to a series of other analyses of statistics. I will mention the most important ones that have some connection with the topic of this article.

In 1882 Dr. Rabinowitz examined and treated the teeth of the students of the College of Finland, and those of the pupils of the private schools of Wyborg, a total of 358, ranging in age from nine to twenty years. The percentage of dental patients in the college was about 44.5. Dr. Rabinowitz concluded that the children of wealthy parents suffer more from caries than do those of the poorer class.

Dr. N. Pakolkoff, at the request of the Minister of War, made an examination in order to ascertain whether the military schools needed the services of a special dentist. He examined 416 students of the school of Omsk and found that 46 per cent. had diseased teeth. In my report, written in 1891, I described my examination of 316 girls ranging in age from eight to twenty years. I found that the number of diseased teeth was 272 in 1183 patients (86.9 per cent.), or 4.6 teeth per head.

According to age, caries are found in the following proportions: From eight to twelve years the percentage of children suffering from odontalgia is 78.9 (or 3 diseased teeth per head); from twelve to sixteen years the percentage was 86.6 (4.5 teeth per head); from sixteen to twenty years the percentage was 92.4 (5 to 6 teeth per head). I have demonstrated that the percentage of decayed teeth increases with great rapidity in children.

With regard to the organization of dental services, I proposed that the remuneration of the dentist be fixed according to the number of teeth treated; in addition it would be desirable to compel the parents to present a certificate certifying the soundness of the teeth at the time of entrance of their children into the school. If this rule were enforced, the parents would not neglect their children's teeth.

In 1889 I read a communication before the Medical Society of St. Petersburg on the disadvantages and insufficiency of improvised treatment, and pointed out the advantages of systematic and continuous treatment. Mr. Laufer, a dentist, at the request of the Inspector of Public Instruction of Vilna examined the students of the college and of the commercial school of Minsk. Out of 403 pupils in the college 301 (or 74.89 per cent.) were attacked by dental caries, and out of 182 pupils in the commercial school 129 (or 70.88 per cent.) were victims of the ravages of this disease. Dr. W. G. Matwiéwa, in 1896, inspected the primary schools of St. Petersburg and found that the majority of pupils had decayed teeth; the teeth of some were covered with a grayish matter, others had swollen gums, and others had offensive breath.

Mrs. W. G. Matwiéwa read a paper on this topic before the seventh sanitary meeting of the government of St. Petersburg, and recommended that the following measures be taken:

First. To establish regular dental services in the schools in order to prevent the various kinds of dental disease.

Second. To establish gratuitous dental services in the hospitals.

Third. To secure immediately the services of dental surgeons.

Fourth. To instruct the pupils as to the necessity of taking proper care of their teeth; and that this task be intrusted to the physician of the school.

Modern hygiene recommends that when caries is arrested the teeth should be regularly examined. It is only by this method that the preservation of teeth can be accomplished; on the contrary, if the services of the dentist are demanded at the time when the disease is in progress, dentistry will play only a secondary rôle. Regular inspection and personal care are the requirements for the preservation of the teeth.

Mr. Price, who examined the teeth of the pupils of the schools of secondary education of England, found that out of 1680 students, 642 use the tooth-brush, that is about 38 per cent., and of these 67 (4 per cent.) did so every day and the others on different occasions.

Dr. Matwiéwa observed that out of 659 boys only 9 per cent. clean their teeth daily, and that out of 184 only 83 (15 per cent.) made daily use of the brush.

The observations upon pupils have demonstrated that only a few carious teeth are filled; hence we can deduce that the importance of caring for the teeth is not yet understood and is but little practiced in the cultivated ranks of society.

Different observations show us that parents who take the greatest general care of their children are exactly the ones who neglect the care of the teeth and prevent our preserving these very important organs. In the presence of such an inertia we must address ourselves to public hygiene, which should intervene at least in connection with school-children. If the purpose of school hygiene is to abolish all the influences which in one way or another can paralyze the regular intellectual or physical development of children, or which may prepare a future pathological field, then the systematic organization of dental services to school-children should be considered a factor of extreme importance. It is about time to recognize that the disinfection of the organism should begin by the suppression of cavities of decay, which are factors in the production of disease. A child cannot develop physically or intellectually if his food is not sufficiently masticated, a condition that must obtain when the teeth are nearly destroyed or when the nervous system, on account of severe toothache, becomes weakened and insomnia follows.

The necessity of regular dental services in the schools will be demonstrated in the following paragraphs:

First. The appearance of caries brings about the rapid destruction of young teeth which are not as yet very strong.

Second. Continuous treating of badly-diseased teeth is a very necessary measure in young children. If these teeth are abandoned they become a focus of contagion for the other teeth, and a center for the development of putrefied products, which are carried to the stomach with the food and to the lungs by respiration; the extraction of teeth interferes with the regular development of the jaws, and if the extraction be painful it frequently inspires the child with a dread of dental operations.

Third. The destruction of children's teeth has a bad influence on digestion, arrests the regular development of the organism, and prepares the field for other diseases. The toothache, becoming

chronic, deprives the child of sleep and rest, and disorganizes the nervous system.

Fourth. In very close schoolrooms the children who have diseased teeth, and consequently an offensive breath, are liable to contaminate the atmosphere.

Fifth. The cavities of decay are very appropriate media for the development of bacteria, which during conversation or coughing are thrown to a considerable distance and can be detrimental to the other children. The dentistry of to-day differs from that of twenty or thirty years ago, yet the treatment of children's teeth is the same to-day that it was at that time.

In the schools dental operations are limited to extraction, and do not comprise systematic treatment. In order to accomplish this the support of the school authorities is necessary. When the boarding-schools have an appointed dentist, this specialist visits the school only once or twice a month, simply for the purpose of treating aching teeth.

Regular dental visits to the schools of the Philanthropic Society of St. Petersburg were begun by me in 1886. At first the examination and operations were performed at the school under very unfavorable conditions, and very often extractions had to be made so as to avoid frequent pain, swellings, and abscesses. The authorities of the schools have contributed very much toward developing the spirit of dental hygiene in the scholars, with the result that to-day they take pleasure in the dental examination. I examine the children in the school, and those who require immediate treatment are sent by groups to my office, where assistants under my direction perform the necessary operations. It is due to the good services of the school dentists that periodical examinations and regular treatment are carried on to-day in different parts of Russia, but all this is philanthropic work and is not as yet very definite.

In the day-schools patronized by the children of families in easy circumstances I have tried to institute treatment in a different way. Since 1891, at the college of Mme. M. N. Stiouriénoy, all the students must submit to a dental examination once a year, and the parents of the children requiring the services of a dentist are so informed by the principal of the school. The parents select their own dentist, and at a fixed time the children must present a certificate from the dentist who undertook the treatment. In 1897 the pedagogic council of the college at Batoum intrusted to the dental surgeons Simonowitz and Tarasoff the examination of the scholars' teeth twice a year. The treatments are given in the dentists' offices, and remuneration is allowed only for filling operations.

In 1896, at the meeting of Russian dentists, a commission was appointed to present to the Minister of the Interior a plan for the organization of dental services. He was requested to take the necessary measures to establish in Russia a system of dental hygiene corresponding to the actual needs. This commission, of which I was chairman, after due consideration of the insufficiency and negligence of dental hygiene in the schools, decided to organize the service in the following way:

First. In order to oblige the parents to have their children's teeth properly treated up to the time of their entrance to the schools, and to prevent children with diseased teeth from contaminating the health of their schoolmates, it will be necessary and compulsory to examine the condition of their mouths, and only to admit children with teeth naturally healthy or rendered so by appropriate fillings.

Second. In order to eradicate dental disease, so prevalent among children, every school should have a dentist who will examine the children's teeth twice a year and will give them the necessary treatment. The remuneration of the dentist should be sufficiently liberal, so that good treatment may be expected from him. The dentist taking up the responsibility of effecting such treatment should have certain privileges to correspond with his knowledge and position. This plan has been duly considered by the state authorities, who have appreciated its full value and importance.

In the military schools energetic efforts are made that the students should receive regular treatment of their teeth. In the superior military schools comfortable dental offices have been fitted up, where, besides the extracting and filling operations, the dentists are constantly working for the preservation of the dental organs. It should be observed that all this work is not of an official character, and it is only through the energy of the director and of the chief physician that these services are carried on.

In the imperial schools of the Empress Marie the dental officer of every institution is assigned a large and comfortable room, in which the students receive dental treatment. A sum of sixteen hundred francs (three hundred and twenty dollars) has been appropriated for the fitting up of the office and for the buying of material. The number of students is equal to that intrusted to a physician; every dentist has charge of two hundred and fifty pupils, and receives a remuneration of eighteen hundred francs (three hundred and sixty dollars). The duties of the dentist are:

First. To take care of the mouths of the pupils and to use prophylactic measures.

Second. To accustom the children to the daily care of the teeth.

Third. To have a detailed record with observations as to the results obtained.

Fourth. To present a report on the expenses and material of the office.

Discussion.

The PRESIDENT. We would like to ask an explanation of a few details from Professor Limberg. Have the statistics been made in relation to the age of children?

Mrs. LIMBERG. Yes.

The PRESIDENT. The point brought out by Professor Limberg in speaking of the value, from a general standpoint, of preserving children's teeth is very important. This point has never been mentioned in such a precise way. The statement of Dr. Limberg concerning the corruption of the atmosphere of schoolrooms by

the foul breath of affected children is also of a very important nature. And there is another point in his paper that we should applaud. It is that the inspections of which he speaks are not necessarily made by the dentist of the institution. The children are to be examined by the dentist of the school and the parents notified of the danger to the child of retaining the diseased teeth that may be present. Under such conditions the amount of good that you will do will be considerable, and the good that will be done in other countries by adopting your system will be equally great, greater than statistics could tell us.

Dr. BONNARD. The consequence of those good results will be the awakening of a great interest in the members of this Congress to organize dental services not only in the communities, but also in the public schools, and in the army, in the countries where these services do not exist as yet. We can but praise and congratulate Professor Limberg for the clearness with which he has treated this question. We have had other communications on this same topic, but none so complete as Dr. Limberg's. The organization of dispensaries is perfectly planned out; he has also considered the organization of services for poor children.

With regard to the compulsory inspection, I will say that the duty of the state is not only to provide education for the children, but also to take heed to general hygiene. If the school appoints physicians it should also appoint dentists.

If our purpose is to preserve teeth, ours is above all a prophylactic aim; we must try to prevent the formation and propagation of dental caries. In his plan, Dr. Limberg demands that the dental inspection should take place once a year, and that clinics be held twice a week; now we should keep in remembrance the phenomena accompanying the eruption of teeth, and it is desirable that the attention of the dentist should be especially directed to these changes. Why? Because, either for want of extraction or of normal shedding of the deciduous teeth, irregularities of the denture may be brought about. What may occur if the temporary teeth do not give up their places to the permanent ones? The permanent teeth will take defective position, producing spaces which will not be brushed very often, and these will become receptacles for material in which acid fermentation will help toward the destruction of dental tissues and the propagation of caries. Hence I do not believe that yearly inspections are sufficient.

We know that dental caries occurs with greater frequency at from fourteen to fifteen years, hence it is especially at this time that the teeth should be cared for. Children should be taught how to brush their teeth just as they are taught how to wash their hands. There are teachers that do not admit the children unless they show that their hands are clean; the same measure should be applied to the teeth; pupils with unclean mouths should not be allowed to enter the school. The same rule might apply both to school-children and to the students of our military schools. The state authorities should be asked to institute four visits a year during the time that the child remains in school.

After considering and discussing the advantages of such frequent visits, Dr. Bonnard said:

There is another point. Dr. Limberg said that the dental inspection could be intrusted to physicians, *provided that they have specialized themselves in dentistry*. This is a wise statement, especially for the French dentists, for in France a physician without any previous study is permitted to practice dentistry. We are glad to have seen that Professor Limberg emphasizes this point, and would desire that all the members of the Congress may accept the principle that a physician, no matter how capable he may be, is not able to practice dentistry if he has not taken up the study of that specialty. Dr. Limberg demands that the preference between two men of equal knowledge and professional worth should be given the dental surgeon.

This is a point which does not belong to the topic of Dr. Limberg's paper, but which nevertheless is of capital importance. In a previous session we said that even for the specialist it was sometimes very difficult to detect some approximal caries of the second degree; but dentists are at least accustomed to the objective symptoms of dental caries, and are experts in the handling of the explorer and mirror. We have seen excellent practitioners overlooking caries of the second degree in children's teeth. (Dr. Bonnard pointed out the evil results that would follow the overlooking of caries, and concluded his remarks by asking Dr. Limberg to accept the modification and to make it four visits a year.)

Professor Limberg answered Dr. Bonnard in Russian, and Mrs. Limberg gave the following *résumé* of his remarks:

Dr. LIMBERG answers that certainly four visits a year would never be too much; in his communication he asks for even two.

The PRESIDENT. We thank Professor Limberg very much, and in conclusion it can be said that Professor Limberg has considered that as no dental inspection exists just now, if too much were asked it might prevent anything being obtained. We have to begin by asking for a little thing, increasing gradually; this is Dr. Limberg's idea.

Dr. BONNARD. It must be remembered, however, that when something is demanded of the state authorities, they grant you just about one-half of what you demand. If you ask for one yearly visit there are many chances that they will not grant it. Ask whatever you consider necessary, and if later on you are obliged to modify the demand, at least you will have the satisfaction of knowing that the opinion of the dental world is against the government's decision.

[At this point of the proceedings the president, Dr. Poincot, left the meeting and Dr. Bonnard took the chair.]

The PRESIDENT then read, in the absence of the essayist, the paper of Dr. MORA (of which an abstract here follows) entitled
LECTURES ON DENTAL HYGIENE; DENTAL INSPECTION OF SCHOOLS.

The origin of Hygiene is most ancient; it has been necessarily the foremost preoccupation of mankind in combating the many elements of destruction by which the human race is environed.

For hygiene involves in itself that very instinct of self-preservation which undoubtedly has always been the prime mover of human kind.

If the importance of hygiene was considered in proportion to the services which it renders, it would be the leading science, and everything would be under its supervision. It embraces the study of all that can contribute to the improvement of the mind and body,—for the influence of the mind over the body plays an important rôle in our existence, and gives to a man character, more energy, and more stability. Hygiene should be the object of constant anxiety on the part of all those who have to care for children's welfare.

Hygiene, which is stable in its principles, must necessarily vary in its applications in relation to the infinite diversity of temperaments and constitutions. Personal hygiene has more than one analogy with pathology, for it embraces the knowledge of the difference between the healthy and the diseased organism. It is that the hygienist,—the specialist in hygiene,—should be a practitioner of the medical art, because the history of disease sheds light on the condition of health. The hygienist must know the weak points through which the enemy may enter the organism, so that he may be able to take the prophylactic measures called for to render unnecessary the intervention of medicine; and should disease set in, then also hygienic measures are the most valuable ones. The theories of Hippocrates are based entirely on hygiene; he permitted the disease to follow its natural course of evolution. To-day we do not do any better; we watch the evolution of the disease, and we rely on the influences of diapedesis and phagocytosis.

Hygienic measures are absolutely democratic, and the working classes ought to be the ones to derive the greatest benefit from them. This consideration alone should suffice to justify all the acts that democratic government ought to institute in view of the general welfare; but the organization of public hygiene, I regret to say, is far from being in harmony with the modern social theories. Hygiene is nearly unknown in villages, and is but very defectively organized in the cities where it exists.

In the presence of this indifference to organizing hygienic measures on the part of the government authorities, it is questionable if it is necessary for experimenters to continue their researches, because all the wonderful discoveries of this century which have caused hygiene to present a new phase, full of promise for the future, will be useless if all the efforts and plans must remain inactive.

We have learned through hygiene how to protect and to preserve the organism by preventing the production of diseases in which the microbe plays an important rôle. Hence our old teacher, Professor Bouchardat, was right when he said that "The study of the causes of disease is the basis of hygiene."

The causes of a great number of pathological states are known to us since the discoveries of our illustrious microbiologist; it is what the ancients used to call *aliquid obscurum et divinum*, and

which in the confusion of the eighteenth century was designated under the name of *contagium vivum*. Thanks to these wonderful discoveries hygienic therapeutics has received a new impetus based on precise knowledge and on facts positively demonstrated. The isolation of patients, strict antisepsis, prophylactic measures plainly deduced from experimentation, have reduced mortality very considerably; the average duration of human life is to-day forty years. We have yet a great deal to learn,—for all the germs of contagious diseases are not yet known to us and some are only imperfectly known; but, judging from what we have learned, we can hope that the day when this deficit in our knowledge will be filled is not very remote. The general results obtained are of a nature to stimulate our efforts, for where hygienic measures are even slightly observed the immediate results are very satisfactory and encouraging, and are in accordance with the previsions of science.

Dentistry, as well as all the other branches of medicine, has largely profited by the modern discoveries; it has entered the scientific path outside of which no progress is possible, no improvement is certain. Dentistry will become through hygiene a preserving art and a greater benefactor of patients; through the popularization of science pathological cases will diminish,—a condition which has already been brought about in general medicine.

This preventive hygiene should be scrupulously followed in schools, which are very often foci for the dissemination of contagious diseases. Hygiene should also be a part of the program of instruction in primary and secondary schools, for if the child should know how to read and write, it is also necessary that he should learn the principles of hygiene indispensable for a rational care of the body and for the prevention of disease. These ideas, if presented to the children in an attractive and simple way, will become engraved in their minds and will be transmitted from age to age.

It is possible, without making too heavy the duties of the teachers,—which are already sufficiently onerous,—to introduce into the curricula of the schools precise laws of hygiene capable of being taught in little time. The inspecting physicians of the schools are those to whom this work naturally belongs, and I should like to see the dental surgeons joining them, for these practitioners only are capable of delivering the special lectures and undertaking the inspection which I will discuss later on. The government has on several occasions considered this question; the Superior Council of Public Instruction, while working for the reformation of university programs, discussed the advisability of teaching hygiene in the schools. The programs were not in harmony with the great progress made by science through the wonderful discoveries of Pasteur; hence it was necessary to change the old college curricula. Professor Brouardel was intrusted with the work of preparing a small treatise in which only facts absolutely demonstrated should be recorded. In the preparation of this treatise he took care that it should be possible to teach it in twenty-four lectures. The topics discussed were the following:

Water. Transmitter of diseases: typhoid fever, cholera, dysentery.

Air. Transmitter of the germs of contagious diseases.

Foodstuffs and beverages of bad quality; and imitations of good products.

Unsanitary arrangements for the evacuation of organic matter; epidemics.

These lectures on hygiene should be given by physicians, who, I believe, are the most competent for this class of teaching. The lectures absolutely necessary should be on the following topics: Water; air; food; contagious diseases; transmission of disease; principal contagious diseases,—Asiatic cholera, typhoid fever, eruptive fevers, variola, measles, scarlet fever; vaccination; tuberculosis; whooping-cough; disinfection, disinfectants; prophylaxis of contagious diseases; the hygiene of intellectual work; salubrity of the school; school diseases; diseases of the scalp; deformities of the body; contagious inflammations of the eyes; parasitic diseases, scabies (the itch), scurf; nervous affections contagious by imitation. This is a *résumé* of the principal subjects that should be taught in all educational establishments without any exception.

The different organs of our economy are of an importance proportionate to the functions that they have to perform. There is no region that deserves more attention than the buccal cavity. It is the seat of the sense of taste, and it is through its agency that we can perceive both the taste and other qualities of substances which enter into our daily food. From the standpoint of cleanliness it is incontestable that the mouth should be submitted to the same hygienic rules as are all the other organs of the body. The mouth is a valuable auxiliary of the stomachic functions and it plays an important *rôle* in connection with esthetics. Besides the advantages to be derived in connection with physiognomy from having the mouth in a completely normal condition, we have those that are connected with the articulation of sounds, the mouth being so greatly concerned in speech and song. These considerations alone suffice to justify the disjunction of dental art from the other branches of medicine, if not in its study, at least in its practice.

Notwithstanding the importance of buccal pathology, this study, which was carried on by some of our predecessors and by the ancients to a fine point, was very much neglected during many centuries. Dental art emerged from oblivion only to fall into the hands of voracious charlatans who have speculated with it until to-day. Nevertheless we must say that since the end of the past century such conscientious and learned men as Fauchard, Bunon, Bourdet, Jourdain, and others strove hard against that state of things and gave a great impetus to the study of buccal affections. Notwithstanding this, dentistry for a long time was to the majority an essentially mechanical calling. Hygiene in those times was absolutely of no importance. Maury in his "Complete Treatise on the Art of the Dentist" only devotes a few lines to the hygiene of the mouth; Lefoulon in 1841 only gives us a few notions on oral hygiene.

Buccal hygiene has now a positive basis; microbiology has given to it the explanation of certain pathological phenomena which hygiene can now prevent. As we know, the mouth is the receptacle of a great number of micro-organisms, of which many are more or less inoffensive; others are even useful; but a great majority are harmful. The *bacillus subtilis*, the *bacterium termo* are, for instance, examples of micro-organisms devoid of harmful properties. A few play a necessary rôle,—a useful one in connection with digestion, for they help the saliva to dissolve the albumin and fibrin, by transforming the starch and coagulating the milk, by dissolving the casein, transforming the lactose into lactic acid. Others, on the contrary, bring about local disorders, or else enter into the circulation and become the active agents of serious infections which sometimes are fatal. These microbes, known as pathogenic, remain in the buccal cavity in the latent state until the day when for one reason or another they acquire an active virulence, the effects of which are shown in the economy by signs which constitute symptomatology.

It was in 1881 that the knowledge of these facts was revealed to us. At that time Pasteur made a communication of great importance relative to a microbe that he had discovered in the saliva of a child that had died from rabies; it was the pneumococcus, which is at the head of the list of those virulent agents among which we find the *streptococcus pyogenes*, the *staphylococcus aureus* and *albus*, the *bacillus capsulatus* of Friedländer, the *bacillus diphtheriæ*, the *bacterium coli*, the *bacillus tuberculosis*. The Loeffler bacillus can persist for considerable time in the buccal cavity after an attack of diphtheria. It has been found under such conditions in all its virulence in patients convalescing from angina fourteen days after a cure had been accomplished.

We must yet mention other microbes whose effects are a great deal less serious, as the *leptothrix buccalis*, which is the most frequently present among the micro-organisms of the mouth; the *bacillus amylobacter*, which is the agent of butyric fermentation, the first cause of caries; the *vibrio regula*, which is the microbe of tartar; the *spirillum buccalis*, which is very frequently found in the saliva and also in tartar.

It is impossible for me to speak on buccal hygiene without entering into a few details concerning caries, which is, in accordance with the ideas of our friend Viau, “the affection which has the greatest importance for the dentist, and which constitutes the principal and nearly the only reason for the existence of dentistry.” It is in every case the consequence of a series of processes where the chemical and microbic agents play a capital rôle. It is certain, at least I believe so, that no micro-organism has in itself the power to produce caries,—to cut through such a hard tissue as enamel,—but it works in conjunction with others in order to bring about a disorganization of the dental tissues through an avenue of entrance in the tooth.

Bouchard’s opinion on this subject is as follows: “Dental caries is not caused by a particular microbe; it is the result of many in-

fective agents. The incessant fermentations which occur in the mouth at the expense of foodstuffs give rise to the production of acids, such as acetic and butyric, which decalcify the superficial layers of the tooth and expose the dentin; the dental tubuli are hence open to special microbic agents, which penetrate and produce the complete dissolution of the calcareous constituents; the organic skeleton of the tooth only remains, the mineral portion having been subtracted by chemical caries." (Bouchard, "Thérapeutique des Maladies Infectieuses.")

Sudden variations in temperature have been considered as an active cause in the alteration of the enamel; also a particularly irregular direction of the fibers of the enamel, such as Tomes has described.

Lastly there also exists an organic predisposition to caries.

Microbes of Caries.—Dr. Miller, of Berlin, has described five species of bacteria in decayed teeth, which he has designated by the letters a, b, c, d, e. The microbe a, which presents itself very often in the form of small chains, or sometimes as diplococci, produces lactic acid at the expense of sugar and brings about the acidity of the mouth. The microbe b is polymorphous; it takes the form of threads, bacilli, and even cocci. Miller says that this is the true pathogenic agent of dental caries. The microbes c and d are cocci, and the germ e is a spirillum. He has described the *Bacillus dentalis viridans*, which is found in the superficial layers of dentin, and the *Bacillus pulpæ pyogenes*, which is found in gangrenous pulps.

What is the process by means of which the microbes produce caries? Miller says that an entrance is necessary.

First stage: Decalcification of the tooth by fermentations and acids.

Second stage: Invasion of the decalcified portion by bacteria, which penetrate into the canaliculi and destroy it.

Third stage: A considerable quantity of organisms of putrefaction penetrate into the carious tooth, decompose the dental pulp, and convert it into an ichorous liquid of putrid odor.

Other causes evidently have a part in the production of caries, ethnic heredity being the most important one, according to Broca and Magitôt.

The inhabitants of certain regions in France are especially liable to be attacked by caries. In some interesting statistics made in France in 1867 by Magitôt, the fact was brought out that caries is more frequent in the regions rich in calcium and less frequent in regions where the soil is poor in that element. The effect of the geological constitution of the soil on tooth-structure is hence incontestable, and it has been put beyond doubt by the work of several authors. Nutrition is also a very important and well-known factor. Animal nutrition, according to some, has a manifest influence upon the production of caries; others affirm the contrary by stating that the carnivora have as a general rule teeth exempt from caries.

According to Mummery the Gauchos of the South American

pampas, who feed themselves nearly exclusively on dried beef, are not subject to caries, while the neighboring tribes of Chilean Indians, who live on vegetables, are the subjects of this disease, the proportion of those attacked being twenty per cent. According to the researches of the late Dr. Andrieu, Parisians in easy circumstances who follow a meat diet, and those belonging to the poorest classes whose diet is principally composed of potatoes and bread, are on the same level as to caries.

Cider and other beverages have also been incriminated. We will say that the teeth are good in Brittany and, on the contrary, carious in Normandy. Now, then, has the quality of the beverages any influence upon dental lesions? It is probable. In the United States, as in Naples, one of the causes of caries would be due to the inordinate use of lemonade.

It has also been remarked that aboriginal populations have preserved their teeth until the Europeans introduced into their country the habits of civilization and other not less appreciable favors, which have changed entirely their mode of living. Cooked and seasoned meat, bread, acid and sweet fruits, and fermented drinks have replaced gradually the raw fish and water which were their primitive food, and in this way introduced caries.

Dr. Amoëdo, from whom we have obtained the details which here follow, observed that when slavery existed in Cuba the Africans had very good teeth, but that their descendants have teeth of not such good quality.

Dr. Amoëdo says that there are three factors which are especially connected with the production of dental caries; these are the influence of race, of food-supply, and of civilization.

Caries in Schools.—Caries is very frequent in school-children, and hence it is incumbent upon us to insist upon the necessity of the public authorities taking serious measures to arrest in these children the increasing propagation of this condition.

In general, hygienic dental care in children is very much neglected, although a good dentition depends very often on these preventive measures.

In proof of the previous assertion the author quotes some of Dr. Amoëdo's observations.

A Chilean minister had sent his two daughters to a convent in Paris, and very soon he had to take them away because they were not permitted to clean their teeth after meals. Another case was that of a child in a school of Bordeaux who brushed his teeth regularly. A punishment that was very often inflicted on him was to prohibit him this hygienic care.

A great number of statistics have been published on this interesting subject; they all agree as to the great frequency of caries in children of all countries. Pedley, who made very extended researches in England, observed that out of 3145 children, 707, or 22.5 per cent., had carious teeth. Unghvari says that 87.2 per cent. of the children that he has examined had diseased teeth, and that out of 23,900, 15.4 per cent. were attacked by caries. A great number of other observers have reached nearly identical conclusions.

Fenchel insisted upon the authorities of Hamburg obtaining a reform in the dental service of the orphanages. Out of 355 children he only found twelve good dentures, or an average of $97\frac{1}{2}$ per cent. of mouths with decayed teeth.

In 1892 Hoppe, of Leipzig, examined only the anterior teeth, which, in children, are most exempt from caries, and found 1000 decayed teeth out of 3000 that he examined; 55 per cent. of these same children presented ganglionic swellings of dental origin.

Röse, after examination of the school-children of the south of Germany, found in 10,000 children an average of 90 per cent. of diseased teeth. Out of 7764 school-children of Fribourg, 99 per cent. had carious teeth.

In England Cunningham has popularized dental inspection in the public schools. Out of 39,279 subjects that were examined, he found 10,500 carious teeth. In another tabulation, out of 8175 children, of from four to eighteen years, he found that 95 per cent. of the mouths were in bad condition.

In 1897 Platschick, Milan, found that in 12,018 children, 92 per cent. of the mouths had carious teeth. In a special examination of permanent teeth erupting between the ages of six and twelve years, he found that in 82 per cent. of these cases the teeth were carious.

The previous data are of such a nature that it brings out the need of taking energetic measures in order to decrease this enormous rate. Everybody agrees in demanding the compulsory examination of the teeth of all school-children. In my opinion the most efficacious remedy for correcting this constantly increasing rate of caries is to be found in public lectures, the nature of which we are now going to discuss.

M. Wolf, of Vienna, made the request that the government should render dental examinations a compulsory measure.

In France, Magitôt states, caries is most frequent in three regions: One in the northwest (French Flanders, Picardy, Normandy, Champagne); the second in the west (Anjou, Poitou, Vendée), and the third one comprising Guienne, Gascony, and Béarn.

We should fear the complications of caries more than anything else, and it is needful to caution the public against the dangers that caries may bring about; to instruct children as to the terrible consequences that may ensue if their dental disorders are not treated according to the principles of dentistry, and if they continue to ignore the elements of the preventive hygiene that we advise. When caries is left to itself it continues to enact its detrimental rôle; sometimes the disease becomes stationary by being changed into dry caries, but more often its detrimental effects bring about an inflammation of the pulp which in time affects the periosteum. We will not mention the bad effect upon the system resulting from the acute pains provoked by these affections. We will point to the more serious disorders which produce a periostitis that may become phlegmonous in character, and the prognosis of which may be very serious.

Abscesses and fistulæ which disfigure so many persons could

have been prevented by appropriate treatment; the effects of these conditions in partial necrosis and muscular contraction render active surgical intervention necessary for their treatment. The drainage of pus into the mouth, whence it is carried into the digestive tract, is liable to have serious consequences.

From the foregoing remarks it is easy to become convinced of the utility of preventive hygiene and of dental lectures, especially in the country towns where carelessness and negligence are so widely spread that it is hard to eliminate them. We are convinced that it is very necessary to modify, by judicious measures, the buccal medium where so many offensive agents have their habitat and are only watching for a weak point to be produced in order to enter the organism.

Such is the rôle of preventive dentistry, or prophylactic dental hygiene; in this way it will be possible to render marked services to our people by teaching them the way to prevent many buccal affections generally due to carelessness or ignorance.

The lectures on dental hygiene that I would like to see forming a part of the curriculum of our establishments of instruction, should be very simple and would act as the corollary of the lessons on hygiene that I have spoken about.

These lectures should comprise very brief anatomical descriptions of the maxillæ and of the teeth; buccal and dental infantile pathology, dental hygiene, comprising the eruption of the temporary and permanent teeth, and dental orthopedia. A very important fact to be demonstrated to the children in these lectures is that hygiene is a factor in preventing caries.

Cleanliness, the use of good tooth-powders, taking care to avoid *sudden changes in food temperature* during meals, etc., are extremely important factors. It will be demonstrated to them that the abuse of sugar and sweets favors the production of caries by the formation of acid fermentations, which dissolve the enamel and provide an avenue of entrance for the agents of caries. All these things must be proved to the pupils; also that the integrity of the digestive functions depends in a great majority of cases on the integrity of the dental organs. Lastly, the child has to be taught to consider every tooth as a most precious organ demanding daily care. Is it not during school years that the teeth demand the most care, and would it not be a serious blunder to let this time pass without instructing the children of our schools on the care that they should give to the dental organs and of the danger to which their negligence would expose them?

The preservation of the mouth comprises cleaning of the teeth by the dentist, daily care to be given by means of brushes and tooth-powders; use of mouth-washes for the removal of food *débris*, which as everybody knows, becomes a culture-medium very favorable for the development of micro-organisms. Now, if the mouth should be cared for when the individual is in good health, *à fortiori* it should also be cared for when in ill health; and not only are these attentions indispensable in eruptive fevers, typhoid fever, and diphtheria, but also in all infectious diseases, and in such

chronic ones as diabetes, Bright's disease, leukemia, tuberculosis, and cancer. Tuberculous patients are always threatened with local infections which, when present, aggravate the prognosis. Lastly, it can be stated, without fear of exaggerating, that any morbid state, acute or chronic, necessitates a rigorous buccal antisepsis. Very particular care must be taken in the convalescent state, especially in diphtheria. Experimentation has shown, as I have said before, that the germs preserve their virulence after the cure and that the subjects in which they are found can in this way communicate the terrible disease to those that surround them. I will not discuss the details of prescribing mouth-washes for patients, I will leave that to the specialist.

The Inspection.—The Consultation Committee of Hygiene and Public Health has long recognized the fact that medical inspection is necessary in private and public schools. Notwithstanding this, medical inspection is only established in a few large cities, and even there it is defective. In the country no trace of inspection can be seen. In Paris the public schools have been provided, since 1879, with a medical service which seems to be very satisfactory, although some improvements could yet be made, as for instance the institution of dental inspection, which would be of great utility.

In all the documents that refer to the organization of medical service, no mention is made of the question of dental inspection. Is it because it has been thought that the medical inspector could undertake this work? I do not know exactly; I would rather believe that it is because the authorities did not consider the importance of dental inspections. The medical service is to-day an established affair, organized by appropriate laws; this affords a ground for hope that it may be very soon completed by the addition of specialists whose services will certainly be of great importance.

After a few remarks of entirely local interest, the essayist continued by saying that there are in Paris more than one hundred thousand children in the schools who do not undergo a genuine hygienic examination, although for the interest of families and for the general welfare it is of absolute importance that a minute inspection should be carried on in all private and public establishments of instruction, in order to apply strictly the principles of hygiene that we have formulated. A quarterly report should be addressed by the physician and the dentist to the mayor of the district; these documents would constitute an interesting and useful set of statistics on the sanitary state of schools and on the condition of the children's mouths. This is surely the most radical manner of instituting a good hygiene intelligently applied, and by observing the nature of diseases and their frequency the authorities would be in a position to organize in our schools the prophylactic measures which form the basis of modern hygiene.

Every year an examination of all the new pupils would be made at the reopening of the school; their general condition and that of their dental organs would be carefully examined, and the advice that would be given to the child or parents would surely have very excellent results. The objection might be raised that the

inspecting physician could be intrusted with the dental inspections. We think that that might be the case if the physician were also a dentist. Now, without underestimating the knowledge of the physician, I will take the liberty of saying that a physician would be only an incompetent dental inspector.

In the foregoing pages I have endeavored to demonstrate the importance of hygiene from a social standpoint and for the isolation of contagious diseases.

Discussion.

The PRESIDENT (Dr. Bonnard). The remarks of Professors Limberg and Mora are more or less of the same nature. Dr. Mora's paper adds one more to the already voluminous list of communications of this nature. It must not be thought that it is so easy to have the authorities take hold of the matter. In 1886 our *confrère* Dr. Godon succeeded in making the municipal council vote for the organization of dental inspections of the schools of Paris, but the prefect for some technical reasons did not sanction the council's decision, and the good efforts of our *confrère* were fruitless. It was not until later on that MM. Godon and Stévenin succeeded, after repeated efforts, in inspecting the schools of one district of Paris. We must present a resolution to the General Assembly based on the contents of the many communications on the same topic that have been presented to this Section, and when you return to your different countries then your *rôle* will begin, in endeavoring to organize these important inspections.

Session adjourned.

(To be continued.)

NORTHEASTERN DENTAL ASSOCIATION.

(Continued from page 673.)

TUESDAY, OCTOBER 16—*Evening Session.*

DR. EDWARD H. ANGLE gave a lecture on "Orthodontia," illustrated by a large number of photographs projected by the stereopticon, and, before taking up the description of individual cases and methods, said in substance:

It is quite probable that malocclusion of the teeth has been one of man's afflictions from time immemorial. It is also probable that each case has differed from all other cases as greatly as each individual has differed from all other individuals, or as greatly as leaves differ on the same species of trees. These innumerable variations in cases, even changing as they do with each additional year in the life of the patient, have been the occasion of much confusion and perplexity both in the teaching and practice of orthodontia.

Naturally, such differences in the appearance of cases early gave rise to the belief and teaching, still adhered to, that each case should be regarded as a law unto itself,—so radically different in its conditions and requirements from all other cases as to necessitate a

different appliance from all other cases, an appliance designed and constructed to meet its special requirements. The result is familiar to you all,—how our literature fairly bristles with regulating appliances ranging from the minimum of simplicity to the maximum of complexity; a few truly ingenious and beautiful in design, but the majority so crude, clumsy, and unmechanical that we are amazed that they were ever placed in the mouths of human beings, much less tolerated there. Others, again, are so absurdly complex that one is led to believe that the designer was laboring under the delusion that complexity was more to be desired than efficiency. It is needless to say that all such complex devices have been failures. While real complexity may be admissible in a printing-press, only extreme simplicity will be found practicable in regulating appliances. Regardless of time, doubtless many of these appliances did fulfill their mission in many of the special cases reported. A far larger percentage, however, we now know from a better understanding of physiology and the principles of mechanics, could never possibly have accomplished the results attributed to them; and as to many of the “completed cases” reported, the kind engraver has often mercifully helped them out.

Very naturally, then, in the absence of any scientific basis of diagnosis or definite plans for appliances, each case was conducted largely in the nature of an experiment. Can it be any wonder, under these conditions, that a model submitted to a large number of dentists will usually elicit nearly as many different opinions as to the requirements, plan of treatment, form of regulating device, and method of retention as there are dentists consulted? Or is it surprising that more failures than real successes have come under the observation of most practitioners? Or that, of the vast percentage of people requiring treatment, the merest fraction are receiving attention?

It now seems clear to me that one great reason for so much that is confusing is that we have been entirely too narrow in our study of cases, oftentimes considering only the immediate irregular teeth, and those usually only the upper incisors, instead of considering the dental apparatus thoroughly as a whole; the powerful influence exerted upon one arch by the other; the wonderful relation existing between each tooth and all other teeth in both arches. Not only this, but also the strong influence of the lips, cheeks, and tongue, and the condition of the throat and nose,—the disregard of any one of these alone meaning in many cases certain failure.

It may seem out of place to here mention such apparently commonplace facts, but I have found a great many dentists, even some teachers of orthodontia, who could not even describe the normal occlusion of the teeth. Until plans less empirical shall be recognized and dentists study the subject more broadly, rising above the notion that regulating appliances mean orthodontia and orthodontia means regulating appliances, we shall make little progress, for, in reality, it should be taught and ever remembered that the regulating appliance is but a small phase of the subject, and only of minor importance relatively to other questions. The same will

hold good no matter to what perfection the regulating appliances may yet be brought,—they will only be a means to an end, and are, in reality, no more to the orthodontist than the colors are to the artist, success in the distribution of these depending wholly upon the education and ability of the artist using them.

Do not think that you can ever construct an appliance, or purchase one, no matter how fearfully and wonderfully made, that will bring about intelligent results in the treatment of malocclusion unless such an appliance be operated by an intelligent mind, the result of judgment ripened by reason. Do not think the most difficult branch of dentistry can be made both a success and a mere side issue to the daily general practice and study of dentistry.

There is much that is interesting and valuable to be learned from teeth in normal occlusion, not alone to practitioners of orthodontia, but to those of every other branch of dentistry. I would ask you to carry with you this evening three basal principles:

First, the necessity for harmony in the sizes of the arches, in order that each may give to the other the greatest support and offer combined and equal resistance to lip pressure.

Second, the harmonious relation existing between the mesial, distal, and lateral inclined planes of the teeth in occlusion, and the stability of position each thus gains. When the planes are in harmony of occlusion, the ideal is reached. The correction of malocclusion is but the establishment of normal harmony between those occlusal planes, and unless this be accomplished our work will be a failure, for these are the true retaining devices, and unless we gain their full support any artificial support is the merest farce. How apparent, then, does it become that our attention should be directed with equal care to the lower arch as to the upper. Nay, more; for the lower arch is the form over which the upper is molded, and is the retaining device, as it were, for the same. The correction simply of "irregularities of the teeth," as it is so often called, into even, regular arches, regardless of the principles of occlusion, usually means nothing more than a waste of time, and the illustrations of the upper arch alone so frequently appearing in the reports of cases in our journals are the merest farce, and can carry no weight to scientific minds.

The third principle I would have you remember is the importance of harmony between the occlusion of the teeth and the muscles of the face. I doubt whether it would be possible to maintain teeth in malocclusion with such perfect muscular arrangement; on the other hand, I am very doubtful as to our ever being able to maintain normal occlusion of the teeth inclosed by inharmoniously arranged and developed muscles.

I shall attempt to show you that keeping these principles of occlusion clearly in mind we shall be able, notwithstanding the fact that there are limitless variations in cases, to readily group them all in three great classes, with two divisions and three subdivisions, as I have already shown in the March (1899) number of the DENTAL COSMOS, and also in a work on orthodontia which I expect will be issued from the press within a few days. We shall further

see that this is not a mere arbitrary classification, but, instead, a most natural grouping, founded upon occlusion.

I shall also attempt to show you that the requirements in treatment of all cases belonging to these various classes are clearly indicated, and that the regulating devices necessary for accomplishing these various requirements are also clearly indicated; and, instead of their being as numerous and varied as the cases themselves, I shall try to prove to you that we can with great profit eliminate all but practically two regulating appliances with their attachments, and that these appliances are founded upon principles as old as dentistry.

Dr. Angle followed his remarks with one hundred and twenty fine stereopticon slides, illustrating thoroughly his classification of malocclusion, with the requirements and various stages of treatment, and the changes not only in occlusion, but in the facial lines of a goodly number of cases belonging to each class.

This lecture was listened to with great interest.

Discussion.

Dr. H. A. BAKER, Boston, Mass. I am so fully in sympathy with Dr. Angle's principles and methods of regulating that I have very little criticism to offer. With your permission, I will repeat a part of what I read before this society one year ago; and I have since read it before nearly all the dental societies in New England. It is as follows:

"To my mind, of all the authors that have written upon the subject of orthodontia, no one has given it so good a definition as Edward H. Angle, who defined it as malocclusion. Wherever you find irregular teeth, you will find malocclusion. With perfect occlusion you will invariably have regular teeth. Not only do I give him credit for giving the correct definition, but I also believe he has given to the profession the best appliance for the correction of malocclusion, although he disclaims originating it. He merely states that he has modified an older method. I consider that Dr. Angle's appliance can be adapted to the correction of a greater number of classes of malocclusion than any other. When the appliance is properly handled, better results can be obtained in the least possible time and with less discomfort to the patient. The arches can be expanded or contracted; protrusion or recession of the jaws corrected; in- and out-standing teeth brought into line, and lack of anterior occlusion corrected by elongation of the teeth. By the same means partially erupted teeth may be brought into position, and rotating in all its forms and combinations may be accomplished. This practically covers all varieties of malocclusion."

Referring to Dr. Angle's definition of malocclusion, I would like to add that he has not only defined it, but he has classified it in its various forms and subdivided the classes. This places it on a scientific basis, simplifies it, and proves that he has given the subject a great deal of thought and study. I frankly admit that by reading his article on the definition and classification my views on

the subject were very much broadened, and I was greatly aided in correcting malocclusions.

I wish to emphasize what the essayist has said in reference to crude appliances and gauge. I believe it to be the cause of failure in many cases. If I were to criticize the writer at all, it would be on the extraction of teeth. I am strongly of the opinion that there are very few, and only exceptional, cases where extraction in order to regulate is good and judicious practice. In reference to ligatures, Dr. Angle uses wire where I use silk. About a year ago we had a long discussion regarding it, and I thought at that time that he had convinced me that wire was the best; nevertheless I find that I am gradually returning to the use of silk, and think that I succeed with it, although I do not wish to convey the impression that I undervalue his method of ligating, as I know that he succeeds with wire. I have, however, found it very valuable after the teeth are in place to ligate them with wire and let them remain for some time before inserting the retaining appliances. The great advantages of wire are, first, its cleanliness, as it does not absorb the secretions of the mouth; second, it holds the teeth firmly in position without injury to them.

I am sorry that the essayist did not give us anything on the retention of teeth, as I believe that it is one of the most important features of the subject; and I think I am justified in saying that it is more difficult to retain them in their proper places than it is to regulate them. I venture to say that any one who has had considerable experience will bear me out in this statement. The essayist, however, mentioned the fact that it is necessary to get the teeth in proper occlusion in order to retain them, and I fully agree with him on this point; and I wish to emphasize the fact that unless the teeth do properly occlude after retaining the case will surely result in failure.

Dr. GEO. C. AINSWORTH, Boston, Mass. I have found great pleasure in following these lines of practice. There are some points the doctor has not spoken of. The matter of extraction is a very interesting one, and requires considerable attention. Each trouble that we see has a cause, and it is very interesting to trace it. The more you study the subject, the more apparent the cause becomes. I believe that the cases where extraction is necessary are rare. Where the lateral occlusion is alike on both sides, it is almost never necessary; where the occlusion is right on one side and wrong on the other, you can scarcely avoid extracting. Sixty per cent. of these cases are caused by mouth-breathing, which is unnatural, and might be very largely overcome if recognized and taken in time and it were made possible for the patient to breathe as nature intended. One of the prolific causes is neglect of the temporary teeth. That is what causes most of the cases where the articulation of the two sides is not in harmony. The molar on one side strikes naturally, while on the other side perhaps the lower temporary molar has been broken up and lost early and the permanent molar allowed to come forward. It is exceedingly difficult to move the first permanent molars backward, the other side being correct, and

it becomes almost necessary to extract. The first remedy is to observe the temporary teeth, and to be more careful about their preservation. The physician must be brought to appreciate the far-reaching effect of any removal and the trouble that is caused by mouth-breathing. I do not think physicians are alive to the possibilities in that line.

Adjourned.

WEDNESDAY, OCTOBER 17—*Morning Session.*

The meeting was called to order at nine o'clock; the president being in the chair.

Dr. FRANK L. MARSHALL, Boston, Mass., delivered the following address:

THE STAPLE CROWN.

Mr. President, Members of the Northeastern Dental Association, and Friends: I have the pleasure of presenting to your notice to-day the STAPLE CROWN,—a crown which I think superior to all others as a bridge attachment for any tooth anterior to the molars, while as a method of strengthening badly decayed teeth it is unequalled. At this point I wish to state that the idea is not entirely original with me. About five years ago a friend told me of a crown made by Dr. Carmichael, of Milwaukee. The principal difference between Dr. Carmichael's crown and my own is that he burnishes gold into grooves made in the teeth to be crowned, while I use a platinum-iridium staple. This staple crown I have used for different purposes for five years with very gratifying results. I have been able to save the nerves of a great many teeth, and have received the thanks of my patients by relieving them from the unsightly open-faced crown. My first drawing will illustrate the preparation of any of the six front teeth for the crown. In this particular case I have used a canine.

Take the enamel fissure bur, have your assistant keep a fine stream of cold water running over the tooth, and quickly cut into the side of the tooth to the depth of the bur. Repeat the same on the opposite side, having the grooves come just back of the contour. Then connect the grooves across the tooth by the use of an enamel bur or a small stone. If the articulation is very close, grind off enough to allow for the thickness of the crown. Then knife-edge your tooth from the cross-groove to the point, as you would an artificial tooth before backing up. (See Fig. 1.)

Next select your piece of platinum-iridium wire, a trifle smaller than the bur; bend a right angle on the end long enough to fit one approximal groove. Take the distance across between the grooves in your eye and bend another right angle in the wire at that distance, thus forming the "staple" which gives the crown its name. Cut the ends of the staple the proper length to fit the grooves, having the cross-bar flush with the palatal portion of the tooth. (See Fig. 2.)

Now take a thin piece of pure gold from 30 to 35 gauge, large enough to fully cover the back of the tooth. Take your staple in a pair of pliers and hold in contact with the piece of pure gold at

about the angle illustrated in the drawing. Solder with 22-karat solder at the point of contact. Bend the gold loosely around the sides of the staple, and trim the cervical portion as illustrated.

Place the staple into the grooves and burnish the gold firmly to one side. (See Fig. 3.) Remove and solder. Replace the crown, and burnish all around back of tooth tightly to the opposite side. Remove and solder. Now replace and burnish all around the free edges. Trim off the surplus; remove; flow 20-karat solder over the outside of the crown, taking particular pains to leave or to keep the edges of the pure gold to about one-thirty-second of an inch free from solder. (See Fig. 4.) These edges are to be burnished tightly to the tooth when the crown is cemented into place. The burnishing is to be done before the cement hardens.

FIG. 1.



FIG. 2.

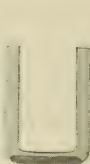


FIG. 3.

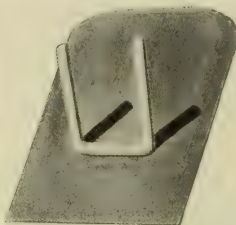


FIG. 4.

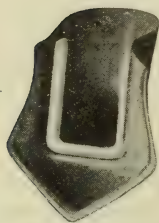


FIG. 5.

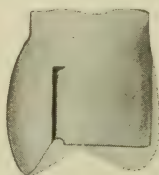
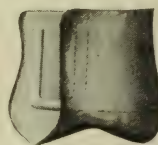


FIG. 6.



The construction of a bicuspid or molar crown is very different from one for any of the six front teeth. The first thing to do is to grind off the inner cusp and straighten the walls of the back part of the tooth. Then cut the grooves in the anterior cusp just as you would in a canine. (See Fig. 5.) Cut a band of 22-karat gold as you would to make a full crown, only not quite so long. Solder one side of the staple about one-sixteenth of an inch from one end of the band. Place the staple on the tooth. Draw the band around the tooth to the opposite side. Burnish tightly to the neck. Remove; push the free end of the staple back about the distance of one line so as to assure a tight fit, and then solder. Strike up your cusps, preferably of 22-karat gold, fit to the top of the band, and solder at the inner point of contact. Put in place on the tooth. Allow the patient to bite firmly to give correct occlusion. Burnish to the cutting-edge of outer cusp. Remove; trim and fill the inner cusp with solder up to the cross-bar of the staple. Allow the solder

to unite the joints between the cusps and the band at the outer or buccal cusp. Burnish all around the edges, and your crown is finished. (See Fig. 6.)

The lower teeth are treated in the same way as the upper, only that a smaller wire must be used.

Discussion.

Dr. GEO. A. MAXFIELD, Holyoke, Mass. I am not enough of an expert in crown- and bridge-work to discuss this paper. One question I want to ask the writer: Does he simply use pure gold around the back of the canine,—for if the pure gold was left it would be very apt to stretch? I am very favorably impressed with the staple crown. It is much more attractive and better than the open-faced crown. I have used pure gold where I wanted to put on the corner of a tooth. I filled the tooth with cement, then burnished the pure gold over it, and this was then cemented on. I have done quite a number of these. I have one which has been in use for six years; I have watched it very closely, and there is no sign of decay. I think this crown is a very practicable idea.

Dr. FRANK L. MARSHALL, Boston, Mass. I do not know that I made myself quite clear. I intended to say, if I did not, that over the whole back of the tooth except the three edges I flow gold 20-karat solder. I take a piece of 20-karat solder large enough to cover the whole back of the crown, and sweat it right down. If you use small pieces, it is liable to run into the gold in places. Take a large piece and sweat the solder over the whole back.

Dr. H. W. GILLET, Newport, R. I. I have been much interested in the discussion of the crown, and I welcome any of the different plans that will enable us to escape from that abomination, the open-faced crown, unless it is gold fillings in the front teeth. When listening to the description, it seemed to me as if there was a possible lack of sufficient stiffness near the cutting-edge. Possibly the principle of the flanged crown recently described in the DENTAL COSMOS might be of service in making the cusps for the crown. I can see that this would be a valuable method in certain cases. It is along the same line as the method of bridge anchorage described by Dr. S. S. Stowell. I feel that in some of these short bridges it is a serious mistake to cement both ends firmly to the teeth, much injury being liable to happen to such teeth if you use them for abutments for a rigid bridge.

Dr. T. C. RUST, Meriden, Conn. I have given considerable attention to the various forms of bridges, crowns, and so on, and I can only say that I am very well pleased with the idea advanced. A competent workman would make very valuable additions in this line to the practice of dentistry.

A paper was then read by Dr. EDWARD C. KIRK, of Philadelphia, on "Some Considerations Relative to the Management of the Infant Mouth."*

*Published in full in the DENTAL COSMOS, May, 1901, p. 462.

Discussion.

Dr. C. S. STOCKWELL, Springfield, Mass. I know that I express the feeling of all present when I say that we are exceedingly grateful to Dr. Kirk for presenting this matter as he has done; he has placed us under obligations to him. It is a comparatively new subject. My first thought in his reading of the paper was that it was a comparatively new theory to me,—for I have never seen a paper upon this subject,—and that the theory was beyond the ordinary practitioner; that period of the infant's life is in the hands of the physician. It is safe to say, as the essayist has said, that it is on the border-line between the two specialties. I am not prepared to discuss it, and I hope soon to have the paper to read for myself.

Dr. JAS. McMANUS, Hartford, Conn. I feel that we owe Dr. Kirk very great thanks for treating this practical subject, this scientific subject, so wisely and in a short article more thoroughly than any man I have ever listened to in any society. I think that he is the first man who has ever put before a medical or dental meeting the idea of the necessity for the care of the child's mouth during the first six months of its life. I have never before heard any one express the idea that care should be taken of the mouth of the child before the eruption of the teeth. He has put that very clearly to my mind,—that the mouth should be taken care of before the teeth peep through the gums. Another thing which he has told us very clearly is in relation to the care the mother should use, and the danger of contagion, or rather infection, which is just as great as the danger from an unclean nursing-bottle. We all of us have at some time been called upon to give advice to young mothers, and many of us have doubtless given advice to them as to the care of the child after the teeth have erupted, but I doubt if any of us have ever suggested to any young mother the care of the mouth before the teeth erupt. I think that this paper of Dr. Kirk's is one of the most valuable that has ever been given to the dental profession at a meeting, and I think that this paper ought to be published in every medical journal, for, as Dr. Stockwell says, this period is the one when physicians are supposed to have the full control; and, if this is true, they should be made aware of the good points which Dr. Kirk has so clearly put forth.

Dr. F. S. FAXON, Brockton, Mass. I do not feel competent myself to discuss this question. I was glad to hear the paper. I think Dr. Stockwell read a paper on a similar subject last year, entitled "Prenatal Care of Children."

Dr. C. R. LINDSTROM, Lynn, Mass. I enjoyed the paper very much, and it occurred to my mind as the doctor brought out the point that the mouth should be absolutely clean—I asked myself, How can you cleanse the mouth? And I would like to ask the doctor that question.

Dr. KIRK. I presented the necessity for oral cleanliness by sterilization. While we may not have the opportunity to sterilize the mouth absolutely, we may still have clean mouths relatively speaking. If we cannot absolutely do this, that is no reason why we should not do the best we can under the circumstances. As to

the practical details of the process, what I have indicated in my paper will, according to my own experience, accomplish the end. Phénol sodique will cleanse the oral mucous membrane better than anything I am acquainted with. With this the infant mouth will be sufficiently cleansed for practical purposes, although I have no doubt that bacteria might be gathered from any mouth. In making the application, make a swab around an orange-wood stick, or by means of a cloth or soft handkerchief wrapped around the finger wash out the mouth. This should of course be done in an intelligent manner, and not carelessly.

I have been asked if the phénol sodique was not objected to by the child. I do not know why it should object to it at all. At that period of life it is the child's normal condition to object, and to express its objection by crying. As a matter of fact, I think the child's nervous system at that age is so imperfectly developed and the irritation produced by the application is so slight that the noise of the child's outcry is out of all proportion to the irritation which provokes it. I do not think this minor consideration should be taken into account.

Dr. D. M. CLAPP, Boston, Mass. I think it would make a very great difference with the ordinary mother. Any application which causes pain is unusual to the infant, and there are not many mothers who would insist on it.

Dr. KIRK. It is true the attitude of the mother, and often that of the father or grandmother, are disturbing elements, but I hold that every practitioner's relation to his patient should be such as to make him the one to control the situation. In the application of the phénol sodique you might appeal to the mother, and show her that it is for the good of the child and to prevent the occurrence of a very unpleasant situation. There is no pain connected with the application; the child resents the annoyance only because the application is not a pleasant performance.

Dr. S. G. STEVENS. This paper should be thoroughly read and digested. One thing I will say: I am very greatly pleased with the paper. It shows the broadness which is coming into our practice; shows that our practice is going to be something more in the future than pegging away at every little hole in a tooth. There is a great deal in what my brother says. Many of us do have questions asked by mothers. Dr. Stockwell presented to us last June a paper on "prenatal teeth." I do not know of any one else who has ever presented the subject. Speaking of using the remedy and of the infant's objection, I would like to say that, when you consider the after-results in using the treatment, I think that the judgment of the dentist will not be questioned. I want to thank Dr. Kirk for presenting this subject, and I am in hope that we may hear more in regard to this subject in the future.

Dr. C. T. STOCKWELL, Springfield, Mass. I would like to ask the doctor one question: Suppose we succeeded in controlling the condition of the mouth as we would like, is it your opinion that the food-supply, the kinds of food, the condition of the mouth being controlled, will affect the prospect of the tooth during that period,—

we will say the first year? Have you any faith in any attempt to control the food-supply at that time?

Dr. KIRK. I do not know that I clearly grasp the point. I presume it must refer to the cases of artificial feeding. When nature furnishes the proper supply of pabulum for the growing infant in the mother's milk, and that supply is normal both in quality and amount, all that can be done in the way of nutrition for the first twelve months of its existence has been done; any departure from that, even a departure to the best, the most carefully selected artificial food, is a departure from the normal, and naturally implies a defect in the nutritional standard. It is a wrong conception to feed infants with this or that predigested food. The country has been flooded with all sorts of pabulums for all sorts of different things, and it is one of the greatest mistakes to employ them indiscriminately. The normal development embraces the sum-total of all of our nutritive processes harmoniously acting. Nature has given us the proper food-supply, but the food-supply is, I believe, but a single factor of the question of nutrition, for it embraces exercise, oxygen, and warmth, and all else that in their total produce the perfection of physical development. The idea of giving food rich in phosphates in order that we should have strong bones, I do not believe in. I do not believe by so doing we can make the body take up more than nature demands and nature supplies. I should like to say one word further with reference to the position of this whole problem,—whether it should come before a dental or a medical audience. As we all know, there is a vast unoccupied territory between dentistry and general medicine. We touch at certain points. Dentistry looks over into medicine, and medicine into dentistry. Still there is an unoccupied territory. This is perfectly right and proper, but with regard to any matter which is not specifically included either in medicine or dentistry, but may be related to the health of the mouth and teeth, let us go in and include it. It should be within the limits of our specialty to take up these problems and deal with them. If we are not consulted on these questions, it is because we have not been competent heretofore to give answers. Let it be known that we have the training to successfully cope with them, and our *clientèle* will appreciate it.

Dr. N. MORGAN, Springfield, Mass. I have one or two questions to ask and a thought to offer. One is in regard to the use of medicine. As we know, there is a tremendous drift toward sterilization of the mouth. The question arises in regard to what we know of the results of this mouth-sterilization. We know very well that the tissues of the mouth are rapid absorbers. Now, take the child during the first six months of his life. I do not know what results we are going to get. Take, for example, a mild solution of phénol sodique. We may think it is all right, and may get good results. Do we know what results we may get? I am skeptical. At that age, with the mouth in the condition it is, with tepid or warm water we can cleanse it. We know that water is a cleansing agent. How much will that do? Will it accomplish all that is necessary if used carefully? How much danger is there in the use of medicine? I simply speak these as words of warning.

Dr. G. F. EAMES, Boston, Mass. It seems to me that this subject is an extremely important one, because it is so practical. I was very much interested in it, as shown by my feeble attempt to discuss it in the year 1883 or 1884. I think that attempt was published, although that discussed only the nutritional effect upon the teeth as influenced by the treatment of the mother before the birth of the child, I think this subject is extremely interesting. I believe it will result in children being advised and educated in dental matters, and that by this means the physicians will have a little light thrown on this subject. Although this territory has been imperfectly occupied, I think the dentist is the one to fill it. Mothers will ask more questions, and should be told of the proper treatment of children and what their care should be. When any particular kind of treatment meets with any objection on the part of the patient, I think the resources of the practitioner should be called upon and the opportunity taken in that direction to enable him to make the proper use of the suggestions contained in the paper we have just heard.

Dr. JAS. McMANUS, Hartford, Conn. I should like to say one word more. Women—that is, a great many—would use medicine carelessly. The idea with which Dr. Kirk has impressed me most is the fact that the child should have its mouth and tongue kept clean. If you use only water, as Dr. Morgan suggests, to cleanse the child's tongue and mouth, you are doing a great deal,—something that has not, as I understand it, been suggested, as far as I know, to any society. It is possible that the remedies Dr. Kirk suggests would be hurtful, but if the suggestions on this matter are brought before them, the medical profession will realize that we have jumped one step in advance of them in commencing with the child before it is six months old by seeing that the mouth is kept as nearly clean as possible. I should advise a little addition of listerine to the water, which would help; but, whether the nurse will do this or not, the main idea is that the child's mouth should be kept as clean as possible with a swab or cloth.

Dr. F. S. FAXON, Brockton, Mass. I hope that one thing which Dr. Kirk said will not prove true. I do not know that we have given instructions enough to know what the real influence is in all cases. The infant does not always derive its nutrition from the mother, and artificial food is given and it thrives very well; and we also know that certain foods are given which are rich in phosphates. They should convey strength to that particular part, and I hope future investigation will show that certain foods, if properly given, will largely cater to the strength of the teeth and bones.

Dr. J. D. SHUMWAY, Plymouth, Mass. One of the favorable things is the indirect benefit which results from certain courses. We cannot see what is going on, but after the first year we know what takes place. Before that, we can only conjecture what certain things may produce, and the influence is an indirect one. It is like throwing a stone into the ocean. It makes a ripple, and goes on and on until it strikes the other shore. How far this influence may go, we cannot say. The first six months' influence may con-

tinue until life is extinct. The other important thing is the necessity for nursing the child in the natural manner if it be possible, but if you have to resort to artificial means, insist that cleanliness is of the most absolute importance.

Dr. E. C. KIRK, Philadelphia, Pa. Mr. Chairman, I have but a few words to say. I wish first to express my very high appreciation of the many kind things which have been said about this matter. I want to refer to the value of drugs. Whether they are harmful or not is largely a question of one's mental attitude with reference to what drugs do. Diseases of any sort are not cured by drugs; there is no evidence that drugs alone ever cured anybody of anything. It is nature which does the work. When we apply the antiseptic to the infant to cure it, it only works in connection with nature by removing a cause of disease. If a splinter be run into the flesh we pull it out, and have thus removed the source of irritation. And similarly with the help of drugs, by the removal of the cause the cure is effected. I repeat, drugs never cured anything, yet we could not get the same effect from water. We must get rid of these germs, which we know produce toxic irritation, so as to give an opportunity for development through the natural processes. It is time now that we had an answer to the question why some people do not have diseases. Why is it that of two men exposed to the same conditions as to temperature only one takes cold? What is it that affects one man and not the other? There is what we call vital energy, or vitality, and this is the principal factor of health. We must take into consideration the natural nutritional status of the child and raise the standard of vitality to a higher point. We must continue cleansing its tongue whenever it becomes necessary. You must use drugs when necessary from that point of view.

Adjourned until 8 P.M.

(To be continued.)

UNION MEETING OF THE DISTRICT OF COLUMBIA DENTAL SOCIETY AND THE MARYLAND STATE DENTAL ASSOCIATION.

THE fifth annual union meeting of the above-named societies was held in the Baltimore Medical College, May 16, 17, and 18, 1901.

FIRST DAY—*Morning Session.*

The meeting was called to order at 11 o'clock by Dr. B. Holly Smith, chairman of the committee of arrangements, and the session opened by prayer; after which

Dr. G. MARSHALL SMITH, president of the Maryland State Society, delivered an address, in which he welcomed visiting dentists, and briefly laid before the convention the advances of dentistry in the recent past and the plans advocated for future work.

Dr. H. JEROME ALLEN, president of the District of Columbia

Dental Society, responded on behalf of his society. In the course of his remarks, Dr. Allen made the following statement:

"After graduation the dentist advances in his profession in three ways: By reading dental books and journals; by his own personal experience and observation, and by the experience of his associates as related in meetings of dental societies. Upon this tripod rests his professional standing and reputation, and should he lack the support and upholding of any one of the three, he ceases in the majority of cases to be a progressive member of his profession, and degenerates more or less rapidly into a barnacle clinging to the side of the good ship Dentistry,—a hindrance to its progress; he gives to his patients only what the dental laws of his state demand as their minimum right. No years of practice are ever long enough to allow a dentist to develop and blossom into full maturity of judgment without the aid of the dental society. Personal contact carries with it the privilege of asking questions, witnessing demonstrations, and becoming thoroughly familiar with the subjects under discussion. Attendance on society meetings broadens one's ideas and views, prevents one from falling into old ruts, and gives him a higher and nobler view of his calling. The interchange of ideas quickens perceptions, awakens mental activities, and brings out the best that is in us. He who before a dental society would become the champion of a new faith or a new discovery must stand in front of the searchlight of past experience and present knowledge. He must endure unflinchingly the scalpel of interrogation, suffer calmly the probes of criticism, and when the ordeal is over and he has had the opportunity of defending his position, his wounds may be closed with the stitches of apology and they will usually heal by first intention. Many a bump of self-esteem that would enlarge to the dignity of a cyst if its owner stayed at home, is punctured readily enough with the bistoury of an exploratory question in the amphitheater of the dental society.

"This is an age of organization and progress, and if the dental profession would keep pace with other professions and reach its highest destiny, it must combine forces and intellect, and strive to reach a prominent and definite aim, and that aim and that destiny become possible only through dental societies."

At the conclusion of Dr. Allen's address, Dr. W. E. GRISWOLD, of Denver, read a paper entitled "A System of Removable Crown and Bridge-work."*

Discussion.

Dr. M. F. FINLEY, Washington, said that he had had no experience with this style of removable bridge-work, but was convinced that it would prove useful. It was the nearest to the ideal removable bridge of anything that he had ever seen, and Dr. Griswold's production of a metal which will endure the great heat

* This paper was largely a repetition of the paper read before the National Dental Association at its last meeting, and published in the DENTAL COSMOS for January, 1901, page 33.

necessary in soldering and still retain a spring temper will be a great benefit to the dental profession.

Dr. GRISWOLD read several letters from eminent dentists in the West who had used the method and recommended it in the highest terms.

Dr. WM. A. MILLS, Baltimore, said he recognized this as a step toward a sanitary system of bridge-work, which is greatly needed. The ordinary bridge-work has been condemned because it makes a sanitary condition of the mouth impossible; this method will in large degree overcome this most serious objection.

Dr. C. J. GRIEVES, Baltimore, had had sad experiences with removable bridges, but thought this system an improvement over all others he had seen. Fixed bridges will naturally become loose, especially extensive pieces, under the strain of mastication. For small cases, of one or two teeth, he preferred fixed bridges. There was not so much strain on them, and they could easily be kept clean, though in large bridges the difficulty is so great as to be usually an impossibility. One advantage this method offers is in the opportunity it gives to restore expression by the restoration of contour to the soft tissues. This is not possible with ordinary bridge-work.

Dr. GRISWOLD did not see why small fixed bridges were to be preferred over removable bridges of this kind. The small removable bridge is as rigid as the fixed bridge, and the springs hold them with a strength that would surprise one. He had tested the fastenings with a pressure as high as 112 pounds without breaking the spring.

On motion, the subject was passed, and Dr. W. H. TRUEMAN, Philadelphia, read his paper entitled "Some Mechanical Problems Involved in Tooth-Destruction and Tooth-Salvation."*

Discussion.

Dr. H. B. NOBLE, Washington, D. C., said he had been exceedingly interested in the paper, and thought these mechanical problems as affecting the duration of the teeth and the dentist's work on the teeth were exceedingly important, and must be recognized if we are going to make our work lasting. The question of treating front teeth worn on the incisal edges had worried him frequently. It requires careful study to determine how they can be prepared so as to give continued satisfaction. We must enlarge the wearing surfaces, so that the wear will be more evenly distributed, and so shape them that it will come on all the surfaces. Sometimes gold fillings are put in the occlusal surfaces of teeth in such a manner that all the force of mastication is brought to bear on the weakest point of the opposing denture.

As to material for filling teeth, gutta-percha is the best of all where it will not be subject to either strain or wear, and soft gold is better against the frail walls of the cavity than cohesive gold. In large fillings he usually combines the two. We must recog-

* Printed in full at page 736 of this issue.

nize the peculiar usefulness of each material, and select that which is best for the particular case.

Dr. M. F. FINLEY, Washington, said Dr. Trueman's paper described conditions that he saw daily in his practice. In many mouths the wear on the teeth is not caused by legitimate use in eating food, but is brought about by the habit of grinding the teeth together either when asleep or awake. Many cases were worn away in this manner. He was glad to hear affirmation of the usefulness of gutta-percha.

Dr. H. J. ALLEN said the warning against the practice known as "extension for prevention" was one of the best things in the paper. He would prefer to refill a cavity three or four times in the course of years than to put in one of these large contours having to cut away one-half of the tooth to enable him to insert it. If such a large filling is lost the extension of the original cavity will have rendered the tooth useless except for crowning.

There was no further discussion and the convention adjourned to meet at 8 P.M., the afternoon being devoted to clinics.

FIRST DAY—*Evening Session.*

The convention was called to order at 8 P.M., Dr. H. Jerome Allen, president of the District of Columbia Dental Society, presiding.

Dr. W. L. FISH, Newark, N. J., then read his paper entitled "Combination Splint and Bridge-Work in the Treatment of Pyorrhea Alveolaris."*

Discussion.

Dr. F. F. DREW asked how long the splints should be worn in such cases. Dr. Fish said from one and one-half to two years. The teeth were held perfectly tight. He had put on a number of these splints, especially on front teeth.

Dr. DAVID GENESE, Baltimore, said he had a case of somewhat similar character about six months ago in which splints and ligatures failed, but with which another style of treatment proved entirely successful.

The tooth had become exceedingly loose from pyorrhea, and it was finally removed from the socket, the apex rounded off, the canal filled with gutta-percha, and after the socket had been curetted to freshen the surface, the tooth was replaced and firmly bound by ligatures. Healthy granulation set in, but the tendency seemed to be to heal from above the apex of the root, which forced the tooth out of the socket, though strong ligatures were used in the effort to keep it in place. Finally he fitted a piece of orange-wood to a Snow and Lewis mallet, and, placing this on the crown of the tooth, gave it a smart blow which sent the tooth to its place. All support was removed and the tooth became perfectly firm in a week. This was done last November, and the tooth shows no sign of loosening.

Dr. FISH was asked if he gave any systemic treatment in cases

* Printed in full at page 741 of this issue.

of pyorrhea such as those described. He said No. His only treatment is the removal of all accumulations of tartar and the use of borolyptol as an antiseptic.

Dr. C. J. GRIEVES, of Baltimore, thought Dr. Fish's splint was the only device he had ever seen which would keep the teeth perfectly at rest.

Dr. WM. A. MONTELL, Baltimore, said if this device would do what was claimed for it, it would be a desideratum long needed. The great difficulty is to get a splint to hold teeth in a natural position after they have been so loose as to sway all around in their sockets. He would try this splint with the expectation of success. As an antiseptic wash he preferred phénol sodique rather than borolyptol, the latter being too stimulating and exciting to the tissues.

Dr. FISH, in closing the discussion, said he was pleased with the reception that had been given to the paper, and he hoped, if any one present should have a case such as described and felt the need of any advice about it, that he would feel free to ask for counsel, which he would be glad to give.

Dr. GEO. V. MULHOLLAND asked Dr. Fish how he got an impression of the teeth in their natural position when they were so loose.

Dr. FISH said the vital thing is the front teeth. These, as described in the paper, are first firmly ligated and then the plaster was introduced against them separately. This impression was left in place and the tray introduced, and the impression of the whole set taken. By following these directions, an impression may be made from which you can get a perfect model.

Dr. J. R. HAGAN, Washington, then read the following paper:

PYORRHEA ALVEOLARIS.

On the *etiology* of this disease so much has been said that I will not enter into any recapitulation of the theories which have been advanced, nor the arguments by which they have been supported, but will simply state that from my own clinical observation and from the results of my own treatment I have concluded that the disease is mostly local in its origin and brought about by the deposition of the so-called serumal tartar about the teeth and their roots. This deposition causes a recession of the gum and soft tissues about the teeth and their roots until the bony tissue is reached. The bony tissue next begins to be absorbed, and this allows the tartar to be deposited deeper and deeper in the alveolus, forming pockets wherein may lodge particles of food and especially pus-forming bacteria, and these by their liquefying action on the tissues cause inflammation in all its stages on to suppuration and necrosis.

Without doubt certain conditions of the system, such as lithemia and Bright's disease, aggravate the condition; in fact, any wasting disease that taxes the system beyond a certain point will help to produce pyorrhea.

It is a well-known fact that the kidneys and salivary glands

act together or vicariously; in some patients all the phosphates will be deposited in the urine, while in others they will be deposited in the saliva, thus causing in one case stone in the bladder, in the other heavy incrustations on the teeth.

Dr. Younger, who knows perhaps as much of the *treatment* of this disease as any other man, asserts that it is local, and can be cured by removing every trace of the deposit.

All understand what care and patience are required to remove all of this deposit on the roots of an upper or lower molar, when the pus is oozing from between the roots. The only guides one has are his knowledge of the anatomy of the parts and the delicate touch of his trained fingers. The pain is excruciating and the patient resists until it is found necessary to have recourse to a local anesthetic. I here give a formula which has acted admirably in my hands: Saturated solution of boric acid 3.8 parts, opium 3 parts, spirits of wine 97 parts. Mix in order named. To two drams of this menstruum use two and one-half grains of cocain. (I have substituted eucain B for the cocain with success.) Mix fresh at each sitting and apply in the following manner:

Wash the mouth thoroughly with distilled water and carbolic acid three to five per cent. This is to be used warm. Fill your syringe with the eucain solution, turn the nut that regulates the graduation until tight, then place the point of the syringe in the bottom of the "pocket," turn the nut back one-fourth round and press the piston, and your syringe will deposit about one-eighth of a drop of the solution. Continue this until you have gone around the root, or to the full extent of the pocket. It is surprising how small a quantity of the eucain it takes to thoroughly deaden the parts.

In removing the deposits I use chisels only, as it is impossible for me to use a draw instrument to remove the tartar at the bottom of the pocket. The chisels I use are not to be found in the dental depots; I make them myself. On beginning, it is best to start at one given point on the root, pressing your chisel once or twice to the bottom of the pocket, then wash out with the phénol solution, for if you allow the blood to coagulate, and catch the pieces that are broken loose, it will be almost impossible to remove them. It is easy to tell when the periosteum is reached, as it has a velvety feeling, and the blood will immediately flow to the top of the pocket. This procedure is to be kept up, cutting and washing out until the entire pocket or tooth is cleansed. The carbolized solution acts somewhat as a local anesthetic, and is soothing to the soft tissues. After cleansing thoroughly one or more teeth, which is enough for one sitting, fill your syringe with slightly warm lactic acid; place the point in the bottom of the pocket and inject the acid till it is seen rising to the top. In this way you are assured that the acid has reached every part. These teeth are not to be touched again for ten days, for there are certain laws that govern the healing of tissues which are usually totally disregarded in the treatment of this disease.

I do not advocate the use of nitrate of silver in the pocket, for it

coagulates the albuminoid elements of the tissues and the pockets remain, but its use is very good above the pockets, as it seems to check the deposit on the teeth,—that is, of the white soft tartar.

After treatment the teeth are often very sensitive to thermal changes. To obviate this use a small piece of paraffin touched with a hot instrument. This will be found to work well where teeth are sensitive around the gums.

Last, but not least, insist that the patient take all the outdoor exercise possible. As for constitutional treatment, if the patient is anemic prescribe tonics, but for a low type of fever prescribe alteratives, such as arsenic. For tubercular diathesis or history give cod-liver oil and iron in the form of Weld's syrup.

Discussion.

Dr. JOHN S. MARSHALL, Washington, D. C., said as the paper deals only with the treatment of the disease, he would confine his remarks to the treatment only. He considers there are three separate and distinct forms of disease:

1. A purely local affection due to local causes,—the accumulation of salivary calculus and food *débris*.

2. A constitutional affection due to the gouty and rheumatic diathesis with the establishment of pericemental irritation, inflammation, necrobiosis, and the deposition of serumal calculus.

3. A constitutional affection due to lowered vitality induced by a multitude of systemic affections which act upon general or local nutrition or upon the nerve centers, producing general nervous debility, local enervation, or reflex phenomena, and characterized by an ulcerative or phagedenic condition of the gums and alveolar process.

The prognosis and the treatment in each of these forms must from the very nature of the causative factors be different. One line of treatment applied to all of them would meet with indifferent success. In the treatment of the first form of the disease local methods of procedure are all that are required. This comprehends the surgical removal of all salivary concretions and food *débris* which have been the cause of irritation, and the employment of stimulating and antiseptic applications to the pockets, until these have closed and the gums resume a healthy condition. The co-operation of the patient must, however, be secured if this result is to be obtained. The most scrupulous cleanliness of the mouth must be maintained by the patient if the treatment is to prove curative. Much of our efforts comes to naught by reason of the fact that the original causes which produce the disease are allowed to reaccumulate. The free use of the tooth-brush and antiseptic lotions applied in the form of a spray to the interdental spaces are necessary to remove food *débris* and to sterilize the mouth.

The pain of the surgical removal of the concretions may be overcome as suggested by the essayist, but his application of one-eighth of a drop at a time to the pockets is rather finespun. I have never been able to measure liquids with such accuracy by any instrument having the form of a syringe,—neither do I think it at all necessary.

The prognosis of *this form* of the disease is very favorable. These, gentlemen, are the cases in which our treatment is so successful and upon which we build our reputations for permanently curing cases of pyorrhea alveolaris.

The treatment of the second form of the disease is a more serious matter, and comprehends in addition to the surgical treatment for the removal of the concretions upon the roots of the teeth, the combating of a persistent constitutional vice, dyscrasia, or toxic condition,—one that cannot be eliminated, but may be modified and rendered less effective by appropriate constitutional treatment and a restricted diet.

In this form of the disease, the first local manifestations are pericemental soreness, or lameness following the taking of a cold, or during aerial conditions which produce a low barometer; or following the excessive use of dry wines or the consumption of large quantities of red meats and game. Local areas of irritation or inflammation are established of a chronic type, resulting in necrobiosis, and the formation or deposition of tiny islands of inorganic salts composed of the urates of lime and soda. These deposits cause continued irritation and a lowering of the vitality of the affected tissue which makes it an easy prey to the action of the pyogenic micro-organisms which may be carried to it in the blood-current. These organisms finding lodgment in soil thus favorably prepared for them, multiply with amazing rapidity and establish a focus of acute inflammation and the formation of an abscess in the pericementum, which later finds an exit for the accumulated pus at the neck of the tooth or through the alveolar plate.

If the cause of the local irritation is not removed and the pocket allowed to heal, the septic conditions of the mouth establish a chronic suppurative inflammation, and accumulations of food *débris* and salivary calculus formed from the oral fluids which have entered through the now opened pockets keep up the irritation, causing extension of the disease.

The prognosis in these cases is very uncertain and discouraging, because of the constitutional conditions which, through the accumulation of the toxic elements within the blood, the quadriurates, make the patient liable to recurrence of the disease at longer or shorter intervals, according to the power of the skin and kidneys to eliminate the toxic material.

The treatment comprehends in addition to the surgical removal of the concretions upon the roots of the teeth, the exhibition of such drugs as will tend to assist nature in eliminating the toxic elements which have accumulated in the blood, and keeping the system flushed by the ingestion of large quantities of distilled water or waters containing lithia. The diet must also be restricted by cutting off the use of all fermented liquors and a large proportion of the meats and eggs. If stimulants must be used, whiskey is the least objectionable.

The treatment of the *third* form of the disease,—which, by the way, is much less common than either of the others,—depends more upon the constitutional treatment than upon the local. In

many of these cases there is little or no concretion to be found upon the roots of the teeth in its early stages, but as the disease progresses the exposed portions of the roots become covered with a very hard, dark concretion having a rough surface as though it had been formed of numerous small globular masses. The margins of the gums are raw and angry red, exhibiting a granular surface. The edge of the alveolus is denuded and gives evidence of a carious degeneration. Pockets are rarely formed and when they are found they are of shallow depth.

The treatment consists in removing the concretions when present, curetting the edge of the alveolar border and cauterizing the gum and alveolar border with a saturated solution of caustic potash in 95 per cent. carbolic acid followed by a saturated solution of iodine in wood creosote. The constitutional treatment is tonics suited to the individual case, change of scene, outdoor exercise, or a sea voyage.

Dr. C. J. GRIEVES, Baltimore, holds that pyorrhea is always a constitutional trouble, and that it cannot ever be cured by local means as long as the constitutional origin of it remains. He described two cases that he had had in his practice. One was due to kidney disease and another to a disorder of the stomach, causing auto-intoxication. These causes being removed, the teeth became firm, the pockets closed up and the gums healed, all without local treatment. His belief was that it was always systemic, and if a condition occurred that was cured by local treatment he considered that it was not really pyorrhea.

Dr. E. P. KEACH asked if Dr. Grievess did not make a distinction between serumal and calcic deposits, and if he had ever seen serumal deposits that did not extend below the gum.

Dr. GRIEVES said that the deposits in the cases he mentioned were distinctly serumal deposits, which he considered deposits from the blood, and were not simply cases of calcic inflammation. He treated the cases thoroughly, by careful removal of all concretions and cleansing of the teeth and roots, but the deposits reappeared; when, however, the systemic disorder was cured, there was no recurrence of the deposits and the pyorrhea ceased.

Dr. KEACH said that it made no difference what the origin of the deposit might be, it is the irritation arising from the presence of the deposit that causes the pyorrhea, and if these deposits are thoroughly removed, and the teeth kept free of them, the pyorrhea will not return.

Dr. MONTELL thought the truth as to the cause of pyorrhea was that the irritation arising from the presence of deposits, either serumal or calcic, on the teeth, causes the condition, but the action of these deposits depends upon a lowered tone of the system. With this lowered tone present the causes may be any one of many. Malocclusion of the teeth is a frequent cause, and there are many others, and a tooth that has become pathological in its surroundings will always be liable to attack. Treatment must be both systemic and local, and if there is the slightest movement in the tooth, the trouble will continue or recur. To find the cause of pyorrhea alveolaris

has puzzled dentists for years. The deposits are entirely absent in some cases, and these will be found the most difficult cases of any to treat. The tooth will be loose, the margin of the gum receding, with a more or less constant flow of pus, and it would be almost impossible to effect a cure. He thought trichloroacetic acid better than any other medicament he had used.

The subject was passed, and Dr. FANNIE E. HOOPES read a paper entitled "Adenoids and Malformation."*

Discussion.

Dr. C. C. HARRIS, Baltimore, said that it was quite a fad with him to observe the breathing powers of his patients, both young and old, and in case of irregularities of the teeth, especially when the upper bicuspids articulate inside of the lower teeth, he always examined the tonsils and looked for adenoids or stricture of the nasal passages. He had a boy now under his treatment for irregularity of the teeth. He had had adenoids, and in consequence was undergrown, was subject to frequent headaches, and was troubled with pain in the eyes. The adenoids were removed and the irregularity is being corrected. The good effect of the deeper breathing brought about by the removal of the obstructions is very apparent. The headache has disappeared, the eye trouble ceased, and in appearance the boy is altogether a new creature.

He spoke of another case, a little girl who was so delicate and so liable to constant colds and headaches that she never was well, and her parents and friends had no hope of raising her. She was operated on, the adenoids were removed, and now she is a healthy, active, and happy child, with no thought of headache and not subject to colds.

He was glad that the subject had been brought before the society, and hoped that all dentists would observe carefully for difficulty of breathing in their patients, and that they would realize the immense importance of the recognition and treatment of this condition when it appears.

Dr. B. HOLLY SMITH had had patients in whom he had discovered these growths. His course was to refer them to a specialist for treatment, and invariably, when this recommendation had been accepted, the result was very gratifying to the parents of the children.

Dr. M. C. SMITH, Lynn, Mass., said that Baltimore should be very free, comparatively, from adenoids, on account of its favorable situation, and from the tone of the paper he judged that it was so. The essayist stated that in this region the worst cases occurred about the age of seven years. In New York city the climax is reached at about ten years of age, in Boston at about fourteen, and in Lynn, which is about ten miles north of Boston, from eighteen to twenty. The reasons there are so few cases in Baltimore are because it is an inland city and because of the absence of wood pavements and soft coal. These are the worst exciting causes; the dust from wood pavements, consisting of fine woody fiber, is exceedingly irritating to the air passages.

* Printed in full at page 723 of this issue.

The picture of the victims of this disorder has not been overdrawn. The diminution of the air supply caused by the diminished passages, the introduction of the air through the mouth on account of the closed nostrils, and the effect upon the digestive apparatus by the dropping of effete matter from the throat with the food supply, together bring about a state of degeneracy, physical and mental, often resulting in the most lamentable breakdown.

One characteristic symptom not mentioned previously this evening is incontinence of urine. A surgical operation will almost always afford relief of the symptoms. He did not believe that patients should be sent to the rhinologist for operation. The rhinologist can remove the adenoids, but that is all he can do; the dentist should be prepared to do this and much more. It is as much a dental disease as is the toothache, and in nine out of ten cases the alveolar arch needs to be widened. This will bring down the nasal septum and give a better air space. He showed models

FIG. 1.

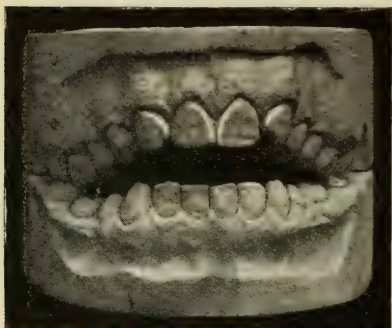
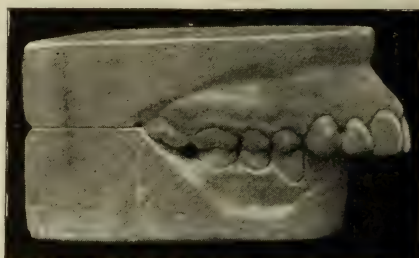


FIG. 2.



of cases of contracted arches which were accompanied by adenoids, and in conclusion stated that he had never seen a case of enlarged tonsils when adenoids were not present.

Here are a few typical models of mouths in which adenoid vegetation existed, and in some of the cases enlarged tonsils.

Fig. 1 (model No. 131). Male, age seventeen; family history good. Notice the separation of the anterior teeth. This condition came on in about one year. Pharynx was completely filled up with adenoids. It was impossible to convince the parents that a surgical operation was necessary.

Fig. 2 (model No. 140). Female, age eighteen. Has never breathed through the nose since two years of age. Pharynx full. A very good specimen of one extreme of adenoids.

Fig. 3 (model No. 54). Male, age about eight. Family history not very good, he being a child of foreign parents. Pharynx full; tonsils almost as large as hen's eggs, notched in the median line for about two inches from above downward. Insisted that his parents should have something done for him, so he was taken to the family physician, who removed a little slice from one tonsil, enough to allow a small ray of light to pass through. Not thinking that the

operation was thorough enough, insisted that they take him back to the physician and let him see the condition that he was in, and thought, of course, he would operate again; instead of that, he assured the parents that all was right, and they employed a new dentist. About four years later he became a feeble-minded child; so much so that the parents admitted it and took him to a specialist, who recognized the condition and had a thorough operation performed. The improvement was most marked; in a short time he was as bright as any child. Two years later he is again suffering from his old complaint.

FIG. 4.



FIG. 3.



Fig. 4 (model No. 20). Male, age about twenty. A good specimen of a mouth-breather. Did not remember ever having had air pass through the nose. Pharynx full; very tough. Complicated with hypertrophy of the turbinate bones.

Fig. 5 (model No. 148). Male, age about thirty. As compared with Fig. 2, this is a very good specimen of the other extreme. In this case you find a very small contracted arch, and one that all dentists delight to make a set of artificial teeth for.

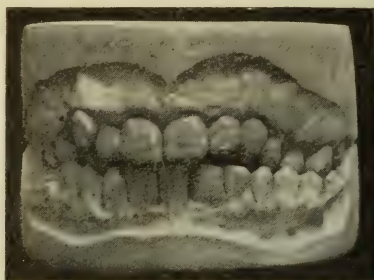
Fig. 6 (model No. 36). Male, age about thirteen or fourteen. A bad case of adenoids; face and mouth quite characteristic; patient delicate and sickly. Advised an operation. His mother said, "Poor boy," he was "too delicate to go through an operation." He was the only child she had, and she couldn't think of such a thing. So nothing was done. In this class of cases the relation between the throat, mouth, and mind is quite constant. Pharynx

full, no air passing through the nasal passages. Notice the occlusion; it is wholly confined to the first molar teeth; none of the anterior teeth touch; the lower incisors are separated and incrustated with tartar. Mind feeble, far below the average; not able to attend the public schools; vitality low, and in all probability will be committed to some home for feeble-minded children. This is the most deplorable condition that we as dentists have to deal with.

FIG. 5.



FIG. 6.



Summing up: Nearly all cases in orthodontia require an operation for the removal of adenoids, and the sooner we recognize the fact and insist on an operation, the better for our patients and ourselves.

Dr. LEVI C. TAYLOR, Hartford, Conn., said many cases of malocclusion of the teeth could be corrected if children could be persuaded to use the teeth more in chewing their food. He had had one patient whose back teeth came together before the front ones did,—of course, holding the front ones apart. He asked him if he chewed his food, and was answered that no attempt even at chewing was ever made. In an effort to get him to masticate his food, he was persuaded to chew chewing gum, and without other treatment the arch was brought into beautiful shape just by this exercise. Children should be taught to chew everything, hard and soft; this will improve both jaws and teeth.

Dr. M. C. SMITH said that it was quite impossible for some of the patients, models of whose jaws he had shown, to chew. Their jaws could not be opened wide enough for them to chew anything.

Dr. W. A. MILLS, Baltimore, said he had been a crank on the subject of adenoids for the past eight or ten years, and examined the throat of every child that came into his office the first thing he did for it, and found that about seventy-five per cent. of all his young patients suffered with adenoids, and he sent them to a rhinologist for removal, and the operation was usually successful.

He believes that seventy-five per cent. of contracted jaws were due to adenoids. He cited the following case:

A male child over seven years old was brought to have a tooth filled, which was supposed to cause pain in the right ear and the right angle of the inferior maxilla. The patient presented the following clinical conditions: Almost complete obstruction of the

nasal cavities; face pale, anemic and haggard; features contracted at the angles of the jaws and beneath the malar processes, giving the characteristics of the mouth-breather, or "dog-face," as Dr. Cathell terms them. I found a small cavity in a molar tooth, which in no way could have caused the pain. This was filled, but gave no relief. I depressed the tongue and examined the tonsils. These I found so greatly enlarged that they almost met at the median line. I was informed that deglutition was both difficult and painful. When the tongue was forced well down with a tongue depressor, quite a large quantity of yellow pus sprang from an unseen source in the right tonsil. On the removal of the depressor, the patient exclaimed, "My pain has gone!" On examining the superior maxilla, I noticed a very perceptible contraction on both sides, anterior to the first permanent molar teeth, with a decided inclination of the roof of the mouth to become elevated. I informed the aunt of the state of affairs, and that unless heroic measures were quickly taken for the child's relief, by a rhinologist, very serious consequences would be sure to follow.

Six months later the patient returned, and I was informed that notice had been taken of previous instructions and a specialist consulted the same day. He had removed some adenoid growths, and was still reducing the tonsils with the galvano-cautery. The patient was now a bright and rosy-faced boy, with normal respiration, and we found no sign of the former contraction of the jaws, or rising of the arch, all of their outlines being perfectly normal.

This particular case demonstrated that either the adenoid vegetations, or the enlarged and diseased tonsils, or both, were the prime factors in the causation, not only of the malformations of the maxillæ, but also the oral respiration. If a correct diagnosis had not been made, and only palliative treatment been given, there is no doubt that a case of V-shaped or saddle-shaped arch would have been developed, with irregular teeth as concomitants, especially as the patient's parents and grandparents are full-blooded Germans, and have large jaws and teeth.

He believed that this and other cases he had known thoroughly justified his conclusion that these cases are not due to hereditary taint, as has been supposed, but are due to the malnutrition caused by the presence of adenoids in the throat. He closed by thanking Dr. Hoopes for her paper.

Dr. HOOPES closed the discussion by simply stating that those who had occasion to remark the great improvement in children who were afflicted with adenoids when they were operated upon would appreciate the importance of this subject.

(To be continued.)

FIFTH DISTRICT DENTAL SOCIETY OF THE STATE OF NEW YORK.

THE thirty-third semi-annual meeting of the Fifth District Dental Society of the State of New York was held at the Yates Hotel, Syracuse, Friday and Saturday, April 12 and 13, 1901.

FIRST DAY—*Afternoon Session.*

The president, Dr. W. F. Tremaine, of Rome, called the society to order at 2.30 P.M., and read an address, mainly dwelling upon the business of the society; after which

A paper was read entitled "The Growth of a Science," by Dr. F. D. NELLIS, of Syracuse.

This paper was a philosophical disquisition upon the theoretical origin of science, with its growth, dissemination, and fruition. Beginning with atomic affinities, Dr. Nellis followed on through the growth of sensation in lower animal life, the instincts of higher animals, to the intellect, the mind of man. This mind,—in childhood immature, unable to grasp intricate problems, developing as age progresses, becoming capable of any culture and eager to achieve all knowledge and conquer all worlds,—with the growth of this knowledge, and the development of the worlds of science conquered and to be conquered, are the themes that Dr. Nellis eloquently and fluently opened up to those who had the pleasure of listening to the paper.

There was no discussion.

A paper was then read by Dr. C. H. BARNES, Syracuse, upon

PERICEMENTAL ABSCESS.

The essayist referred to a paper upon the same topic by Dr. Kirk at the meeting of the State Society last year at Albany, describing the condition from copies of the illustrations there presented, and adding a report of some cases which had occurred in his own practice, the first one of these being illustrated by a drawing showing a pericemental abscess at a stage when it can be clearly diagnosed and when it is usually presented for treatment. The pus has penetrated the alveolus, and the sac shows plainly in the gum-tissue.

Dr. Barnes said: Of the nine cases that I have recorded in the past seven years, eight of them were on the buccal surface. In four cases I have been unable to find any opening through the alveolus to the root of the tooth, and I am wondering whether these cases were not periosteal in origin; that is, originating in the periosteum on the buccal surface of the alveolus instead of in the membrane lining the tooth-socket. If a point of diminished resistance may occur in the pericementum lining a tooth-socket, why not also in the pericementum, a quarter of an inch away? Perhaps I speak as if a pericemental abscess always occurs on the buccal surface. It does so in nearly all cases.

The diagnosis and treatment are comparatively simple. As I said, the figure shows the stage at which it usually presents for treatment, though it may present during the inflammatory stage, when it is difficult to diagnose between it and a mild alveolar abscess, except for the fact that the tooth is very slightly sore during the first stages. In the cases I have seen, the inflammatory period has usually lasted three or four days; sometimes less than forty-eight hours. In my last case, a woman of sixty-five, it was at least ten days from the time I first saw the case until I opened the sac.

It shows, so far as I am aware, only in cases of uric acid diathesis, and might be regarded as the primary lesion of pyorrhea alveolaris. I presume all of us have made the mistake of drilling into a live tooth expecting to find a dead pulp causing a pericementitis.

A few words as to the treatment, and then I will give a detailed account of the few cases I have had in practice. Nature will do a great deal in these cases if she has a little assistance. Open the sac freely with a deep incision one-quarter to one-half inch long; remove any concretions that may be on the root; wash out thoroughly with hydrogen dioxid and mercury bichlorid, 1 to 1000, equal parts. Following this with a strong solution of iodine seems to stimulate the tissues to an energetic, healthy action, and the cure progresses rapidly. Usually no more treatment is necessary. I should like to go into the bacteriology of this lesion, for it is interesting, but by the time I have gone over these cases I shall have taken more time than I should.

Case No. 1. (1895.) Harry M., aged twenty-two. Lower right first molar. I thought probably a sliver of toothpick was the cause; lanced it, but could find nothing. There was immediate relief, and it entirely healed in two days. Two years later patient developed inflammatory rheumatism. His teeth require scaling twice a year at least.

Case No. 2. (1896.) Edward D., aged twenty-six. Upper right first molar. I opened the tooth and found the pulp in the palatal root dead, in the two buccal roots alive. On finding this condition, I thought the cause to be as in the former case, and treated as before, without finding any cause, and recovery was complete in a few days. Rheumatism both on father's and mother's side. Considerable calculus on teeth.

Case No. 3. (1897.) Mrs. G., aged forty-five. Bad case of pyorrhea of long standing on lower left lateral and canine. The abscess in this case occurred on the canine's labial surface nearly at the apex. Treated the same as I would a pyorrheal pocket; it was a week in healing. As I remember, I did find in this case some calculus on the root. Two years later the pyorrheal pocket had extended to the apex. Teeth are fine; little caries; some gum recession on a few teeth.

Case No. 4. (1899.) John M., aged fifty-three. Upper left second molar. In this case the inflammatory stage lasted three days, when I first saw the case, and I immediately opened the sac. The following day I opened again and evacuated some more pus; it healed rapidly after this. Teeth are fine; considerable tartar removed once a year.

Case No. 5. (1900.) George R., aged thirty-six. Upper left second molar. Had never had anything done to his teeth. In about ten cavities caries had commenced some years previously and ceased. Not a large amount of tartar on his teeth; gums in a fairly healthy condition. This case showed more inflammation than any I have seen, and it was four days before pus ceased to form, and fully a week later before it had healed.

Case No. 6. (1899.) Miss D., aged thirty. Upper left

second bicuspid; bad pyorrheal pockets on tooth; had already lost ten or twelve teeth from pyorrhea. With persistent probing I could find no opening between this sac and the pyorrheal pockets on the tooth. The pulp was alive, for I drilled into the tooth to be sure. Treatment for a week produced no appreciable improvement, so I extracted the tooth, which was very loose.

Case No. 7. (1901.) Dr. B., aged thirty. Upper right second molar. Inflammatory stage lasted thirty-six hours only, when I opened it; it was completely healed two days later.

Case No. 8. (1901.) Mrs. T., aged fifty-seven. Rheumatism and pyorrhea apparent in her children and grandchildren. She has lost most of the teeth back of the incisors from pyorrhea. The inflammatory stage lasted over ten days, and the sac was located almost on the alveolar ridge back of the lower left second bicuspid, which was the tooth involved. Treatment as before; recovery rapid.

Case No. 9. Miss S., aged twenty-seven. This was perhaps the most interesting case of the series. Patient was sent to me by a physician, with the statement that she was suffering from uric acid poisoning, and the request that I take charge of the mouth. The inflammation had been acute, and besides a recession of the gums all over the mouth, there was sloughing between the molars and between the molars and bicuspids, in some places exposing the alveolus. I removed considerable serumal calculus, the accumulation of one year, and freely applied strong solution of iodine. Of course, she was under constitutional treatment at this time. The gums healed rapidly. About a week later she presented an abscess on the lingual surface of the gum opposite the lower first molar. I opened this and found that it had no opening under the free margin of the gum, neither could I force the probe toward the apex of the root. The tooth has a gold cap on it, and I do not know whether it is alive or dead. I expect to remove this cap, as the recession of the gums has exposed all the edges, and then I can state definitely whether the tooth is dead or not. My personal opinion is that it is, and that I have found a pericemental abscess on a dead tooth. This abscess, following as it did the acute inflammation of the gums, to my mind goes to prove the close relationship between this lesion and the retention in the body of uric acid. Evidently this abscess was in a state of incubation during the period of gum inflammation. I neglected to say that this case healed rapidly and entirely.

Discussion.

Dr. W. F. TREMAINE, Rome, N. Y., asked the essayist whether he agreed with the theory that pyorrhea was due to the gouty diathesis.

Dr. BARNES said that it was more generally accepted as true that it was due to a lack of tone in the system, arising from lack of nutrition on account of faulty assimilation of food.

Dr. A. G. COURTNEY, Syracuse, asked Dr. Barnes whether he thought that the uric acid diathesis was the cause of the last case

referred to in his paper, or was it caused by the gold cap on the tooth. He thought that ascribing such cases to uric acid or other systemic causes was too prevalent. In former times, they would have been charged to local irritation. The edge of the cap in contact with the gum, unless it was very smooth and fitted the tooth very closely, might give rise to a local inflammation, and this might easily produce the abscess. At the present time these abscesses are more rare than formerly, because more attention is given to the hygiene of the mouth. Any point of irritation about a tooth, whether it is a gold cap or accretion of tartar, would be liable to give rise to such an abscess.

Dr. BARNES said in this one case the gold cap was a possible cause of the trouble, but in the other cases there was no possible local cause apparent. He thought most men to-day considered that uric acid only caused such trouble by reason of the fact that in the uric acid condition there is usually a state of malnutrition.

Dr. F. D. NELLIS, Syracuse, said that any abnormal deposit within the pulp-chamber can only be caused by inflammation. We should take a common-sense view of these little abscesses which collect on the roots of the teeth. They are nothing new; they have always existed, but we are now, for the first time, taking notice of them and giving them queer names, so as to lay the foundation upon which to build a new theory. Periosteal and peridental membranes are exactly the same thing, except that one covers bone and the other the tooth. A blow on the finger will sometimes cause a felon. The mechanical force we employ in an effort to preserve or regulate a tooth may make a bruise on the peridental membrane and give rise to a similar kind of abscess. He spoke of a case which came to him sixteen years ago, of a patient who had an abscess on the root of one of the central incisors, which had been discharging for a year or two. The dentist who had had charge of the case had told the patient that the tooth must be extracted, as the abscess could not be cured. Dr. Nellis, however, treated it as such cases were treated at that time, probably with a weak solution of iodine, and the abscess healed. He thought its cause was that one of the teeth lapped over the other, and probably some unusual strain had caused a bruise of the peridental membrane. However, both teeth are alive and in good shape to-day, though it is now sixteen years since he treated this abscess.

About fifteen years ago he had heard a paper read by Dr. E. T. Darby, of Philadelphia, arguing that uric acid was one of the most detrimental substances that could exist in the human tissues, and that it could not exist without causing alveolar pyorrhea. He was satisfied that this statement was too broad. He did not think one cause could produce so many different diseases as uric acid was charged with. Any cause that will give rise to inflammation in the teeth may cause an abscess.

Dr. BARNES said that he did not contend that all such abscesses were due to uric acid poisoning, though in the last case described the patient was just recovering from uric acid trouble.

The subject was passed, and the convention adjourned till next day.

SECOND DAY—*Morning Session.*

The society was called to order at 10.30 A.M., and the following paper was read by Dr. H. H. TOMPKINS, Utica, N. Y.:

THE AVERAGE DENTIST AS A BUSINESS MAN.

A temperance organization to which I *once* had the honor of belonging had for its aim certain humanitarian objects, the accomplishment of which reflected credit upon itself; and a portion of each session was also devoted to exercises of a social and literary character, which were termed "for the good of the order."

Most of the subjects discussed in our meetings are of a scientific nature, and the communications presented often embody the result of careful research and investigation, reflecting credit upon the essayists. As its title indicates, this paper is of a very different character, and it will not in any way reflect credit upon its writer; the most that can be claimed for it is merely that it is a record of observation, with possibly some little thought as to the methods of removing present difficulties, but it is hoped and believed that it will be "for the good of the order."

If you have calmly considered the topic for a moment, I think you will agree with me that the average dentist is an extremely poor business man. Outside of our largest cities, I will venture to assert, there are very few dentists who can draw a check for a thousand dollars, or, in the event of their death, leave an estate of ten thousand dollars; yet these are very moderate sums when we consider the knowledge, skill, and ability required to successfully conduct our profession and as compared to the financial status of men engaged in other occupations requiring relatively the same ability.

By a little quiet conversation with the gray-haired men of our profession and those whom we most delight to honor, as we meet them in their homes and at conventions, it will be found that, while now and then there is a shining example of prudence and economy, the great majority of them feel as though they were "up against the grindstone" every day, and that they are working as hard for their daily bread now as they did at the age of thirty; and yet each and every one of them has handled enough money during his lifetime, so that there is no excuse for this condition of things. Now, the object of this paper is to bring ourselves face to face with facts, and to discover if possible the causes which lead to this condition and the means of remedying them.

It would seem that a careful study of the conditions surrounding a dentist's life would reveal the fact that the cause is internal rather than external; I mean by this that the trouble does not come by reason of the fact that we are not, as a rule, fairly paid for our services, but that the difficulty is with ourselves in the management of what may be termed our business matters. We do not manage our business as other men manage their business.

It is more than probable that the first and greatest reason for this lies in the fact that we are, and *should be*, professional men rather than commercial men. Few if any of us have had a business

training. All our early study and ambition has been to attain excellence in our profession as a profession, and the matter of running the business as a business has received little or no attention.

As an object in life, the mere accumulation of money, in my judgment, is about the poorest ambition a man can have. I believe there are better and grander objects to accomplish than devoting one's time and thought to the mere matter of piling up cash; but after a man has attained proficiency in his calling and energetically worked the best years of his life, it should follow that the fruits or returns therefrom should be sufficient to place him beyond need in his old age.

When we wish larger returns from our business, we usually look to the matter of getting larger fees and working a little harder and a little longer as being the one road to that end; but I have only to cite the instance of our honored friend and teacher, Dr. Atkinson, a man who received immense fees for his services and yet died penniless, to prove that the matter of fees and hard work alone will not solve the problem. It is said that Dr. Atkinson's failure is attributed to reckless extravagance in living, and I have no doubt at all that the same thing may have something to do with a good many of us,—reckless extravagance in our ideas of living, and dress, and the use of materials. You know it is really beneath the dignity of a dentist to actually save anything. "Nothing too good for us!" and "Everything goes!" are common expressions. I have seen men use plaster of Paris as though it were manna dropped from heaven; it is nothing unusual to see a man mix up amalgam or cement enough to fill twenty cavities of the size of the one before him. I have seen operators filling a front tooth using a piece of dam extending at least from eight to ten inches below the patient's chin, and others using floss silk as though it were a kite string without an end. Of course, none of these things costs anything, but, all the same, when they are gone we have to purchase more. The average dentist is also a most careless buyer. He buys most anything that any Tom, Dick, or Harry brings along and wants to sell; and if a person stops to make a little estimate of what is really of value to him, he will find that unless he is extremely careful in his selection he will not use half the things he has purchased in this manner. But we will pass all these observations for what they are worth and come to the main proposition, as previously stated,—viz, We do not manage our business as other men manage their business, but our business manages us.

It would surprise one who has not investigated the matter a little to learn the number of men there are who actually do not know what their expenses are for a year. Almost every operator knows that he has taken in about so much money during the year, and that what is not in his possession he must have spent; or, what is far more likely, he will have to earn a whole lot of money the ensuing year to balance the deficit of the previous year. Many of us are drifting along, trusting in Providence that somehow we will come out all right. This is absolutely disastrous in conducting a successful business, and it is as unnecessary as it is disastrous. A

man who is earning a dollar a day and spending a dollar and ten cents is always and everlastingly in trouble; a man who is earning a dollar a day and spending not more than ninety cents of it is always a happy man.

It would not surprise me at all to find that ninety-nine men in one hundred were unable to tell how much money they have invested in their office, and what percentage that investment is paying them. I would advise that a man take a careful inventory of his stock, tools, and appliances at least once a year; that he know what percentage that investment is paying, and that he make that a basis for future expenditures and improvements. I would not only advise this, but also that at least once a quarter a man make out a tabulated statement of his assets and liabilities, and that he know exactly how he stands. This knowledge will enable him to keep his expenses within his receipts, and, in addition, should give him a good bank account.

Of course some one will say, "This would be a great deal of work," and that he cannot bother with it. Just the same, however, it is a great element of success, and it is not too much trouble and work for men in other lines of business. An ordinary wholesale druggist will have at least thirty thousand different articles on his shelves; our department stores must have several thousand more than that, and yet each and every one of them takes an inventory every year, and they know what their business is paying them and what department of their business is paying them best.

Another important factor in the conducting of a successful business is the collection of accounts. There is no more reason why bills for professional services should not be collected than bills for merchandise or any other form of indebtedness. We should not hesitate to sue each and every account not otherwise collected within a reasonable time. Business is business, and the sooner we attend to this feature of it, as other men attend to the same feature, the sooner a good many of us will be out of trouble. While a few people may think we are very mean fellows, the majority of the community will have a great deal more respect for the profession.

In this connection, it may be suggested that the importance of knowing something about the financial responsibility of our patients before doing the work cannot be overestimated. There is no more reason why a professional man should give everybody credit who asks for it than there is that a merchant should do the same. We do not have Dun's or Bradstreet's report, yet it is comparatively an easy matter to learn something of the financial responsibility of most of our patients. Of course it takes a little time and it is a little work to look this matter up, but it does not take half as much time nor is it half as hard work as it is to perform the proposed operations and lose our time, strength, energy, and material. And it does pay, for I know of at least one operator who in the past ten years has lost less than one per cent. of his gross charges by reason of poor accounts.

Another thing that every man should do is to keep a personal account-book with his dental dealers. I have investigated this

matter somewhat thoroughly, and it is sad, but true, that not over twenty per cent. of those who are running accounts with dental houses can tell how much they owe them, nor whether the monthly statements sent in are correct. I am willing to give the dental dealers credit for being honest, but, all the same, they are human, and occasionally make mistakes, and it will pay any man who does not do so to keep a personal book account with them. On more than one occasion have I known of mistakes being made. Many times goods are returned for which no credit is given, and sometimes even worse. I will cite just one instance which occurred in my college course. I got permission to take a few instruments home with me for trial, amounting to four dollars and a half. They were subsequently returned. Imagine my surprise some days later when I came to pay the account to find that those goods, instead of being placed to my credit, were again charged to me. I did not have the instruments, and, in addition to this, the dealer wanted nine dollars. On another occasion I was purchasing goods at the same time others were, and I subsequently found a bill charged up to me of seven and one-half dollars for goods which another man had purchased. I relate these not with the idea of discrediting the honesty of the house with which I was dealing, but merely to show that mistakes are made, and that a great deal of money can be saved by keeping an accurate account of our indebtedness.

In closing (this means, of course, that I am just half through), I want to suggest one way in which we can make a very great improvement, which will result in an appreciable increase in our income. All of the leading dental houses are giving discounts to-day, the same as other commercial houses. In talking with a business man a day or two since I learned that the firm which he manages saves from fifteen hundred to two thousand dollars a year in discounts, and a dentist can save proportionately the same amount. All business men in these days intend to take advantage of cash discounts, and yet, to my surprise, I have learned that a careful estimate will show that only ten per cent. of our profession are regularly doing this. Of this ten per cent., six are paying cash for goods when they are purchased, and thereby saving from three to five per cent. The remaining four are wisely sending the dealer with whom they are doing business a check for one hundred dollars and getting a receipt for one hundred and ten dollars, thereby making a handsome profit to start with.

Now, there is nothing in the world which will make money so fast as to save a little money and use it in this way. A man can almost afford to go to the bank and get the money and pay six per cent. for it, and then save four per cent., which is all that government bonds are paying to-day. We are all looking for good investments, and right here, under our noses, is an investment which very few of us are taking advantage of, and yet it pays ten per cent. And the best of it is that, with the exception of precious metals, we can buy supplies of every name and nature in quantity lots and have them apply on the one-hundred-and-ten-dollar receipt. It will pay any of us to make out a little estimate of what we are liable to

want for the next three months, and, for that matter, what we are apt to want in the next year, and buy in quantity lots. I will not attempt to exhaust the list, but merely suggest the principle taught in the fact that three dollars can be saved on a gross of burs; buy three hundred dollars' worth of teeth at a time, and make a clean profit of sixty dollars; buy an ounce of gold cylinders at a time and pay cash for them, and make three dollars; do not buy cottonoid at all, but go to the drug store and buy a quantity of lintine, which is exactly the same thing, and, instead of paying one dollar a pound for it, get it for forty-five cents, which is a profit of one hundred and twenty-two per cent.

This is what I mean by running the business as a business, and a little attention given to these matters will yield such handsome returns that when it comes time for our summer vacation we will have enough money to take a trip to Europe, and have it cost us nothing more than a little thought and foresight.

If I have in any degree set forth the subject on which I intended to speak, it will be seen that in order to conduct a successful business, first, a man must "clear the deck" and manage the ship, instead of helplessly drifting to any port that wind and tide may take him; second, that money earns money, and that the making of money is an art and does not consist alone in hard work, but largely in careful, prudent management, which is not taught in any college and must be learned in the school of life.

Discussion.

Dr. A. R. COOKE, Syracuse, said it was evident to any one with a wide circle of acquaintance in the dental profession that dentists were not generally good business men. They were not brought up in business habits, and usually did not see the necessity of acquiring those habits, and thus they were never able to handle their business to good advantage. Prudent expenditure and thoughtful acceptance of opportunities for advantageous buying are among the important factors for success. He did not believe it wise to sue for accounts as a rule. The attorney's bill would usually take most of the returns, and the patient would feel so hurt that his patronage would be lost and his influence would always be against you. If accounts were of sufficient magnitude and were always against those who had property it would be different.

He did not see the necessity of taking frequent inventories of instruments and materials on hand. He had always kept a cash account, but never an inventory of what he had nor an account of what he used. The real secret of financial success in dentistry is to live within our means. Money is easily earned, and spent quite as easily.

Dr. TOMPKINS said that the reason he wrote this paper was from the result of his observation and what he had learned of the circumstances of members of the profession. He was surprised to know that not more than four per cent. of the dentists in the state take advantage of the discount the dealers allow those who buy one hundred dollars' worth at a time. It scarcely seems possible that

any practicing dentist would not have the one hundred dollars, and the profit is so large, in proportion to the interest paid on ordinary investments, that it is quite an item.

Care in regard to the small matters of waste, which of themselves are of small account, will produce a habit of saving that will count large in the long run. Things that are wasted benefit no one, but the total saved by care would in a year or two be of considerable importance, and the gain thus made spent in improving the fittings and adornments of your office would not only add to your pleasure, but would increase your practice and induce a more desirable class to become your patients.

The subject was then passed.

(To be continued.)

ILLINOIS STATE DENTAL SOCIETY.

FOLLOWING is a list of officers and committees elected for the ensuing year at the last annual meeting of the Illinois State Dental Society:

M. L. Hanaford, Rockford, president; J. E. Hinkins, Chicago, vice-president; A. H. Peck, 92 State street, Chicago, secretary; C. N. Johnson, Chicago, treasurer; J. T. Cummins, Metropolis City, librarian. Members of Executive Council—J. R. Rayburn, Fairbury; W. E. Holland, Jerseyville; J. G. Reid, Chicago. Executive Committee—J. W. Cormany, Mt. Carroll. Publication Committee—A. H. Peck, Chicago; C. N. Johnson, Chicago; Edmond Noyes, Chicago. Board of Examiners—Edmond Noyes, Chicago, to succeed C. M. Robbins, term expired. Committee on Dental Science and Literature—G. V. Black, Chicago. Committee on Dental Art and Invention—H. J. Goslee, Chicago. Committee on Infraction of Code of Ethics—T. L. Gilmer, Chicago; A. S. Waltz, Decatur; O. L. Frazee, Springfield. Supervisor of Clinics—D. M. Gallie, Chicago. Committee on Local Arrangements—O. L. Frazee, chairman, Springfield; assistants, E. F. Hazell, Springfield, and T. P. Donelan, Springfield.

KANSAS STATE DENTAL ASSOCIATION.

THE Kansas State Dental Association held its thirtieth annual meeting at Leavenworth, Kansas, May 8, 9, and 10, 1901. There was a large attendance, and a very interesting program was presented, of which porcelain work, which is now receiving so much attention from the profession, was a prominent feature. Besides the contributions of members of the society, the convention was favored with a paper and clinic upon porcelain work by Dr. D. O. M. Le Cron, of St. Louis.

The association received more new members than during any previous meeting except that of 1891.

Hutchinson was chosen as the place for the next meeting.

The following officers were elected for the ensuing year: O. H.

Simpson, Dodge City, president; E. Bergstresser, Abilene, first vice-president; T. I. Hatfield, Marysville, second vice-president; J. W. O'Bryon, Lawrence, secretary; S. J. Renz, Leavenworth, treasurer.

J. W. O'BRYON, *Sec'y*.

CENTRAL DENTAL ASSOCIATION OF NORTHERN NEW JERSEY.

At the annual meeting of the Central Dental Association of Northern New Jersey, held on the evening of February 18, 1901, the election resulted as follows: Frank G. Gregory, Newark, president; J. W. Fisher, East Orange, vice-president; Frederick W. Stevens, Newark, secretary; Chas. A. Meeker, Newark, treasurer.

FREDERICK W. STEVENS, *Sec'y*.

G. V. BLACK DENTAL CLUB OF ST. PAUL, MINN.

THE G. V. Black Dental Club, of St. Paul, held its fourth annual meeting May 17, 1901. The following officers were elected: G. F. Andrews, president; Scipio Bond, vice-president; J. M. Walls, secretary and treasurer; J. E. Weirick, E. K. Wedelstaedt, and W. N. Murray, board of censors.

J. M. WALLS, *Sec'y*.

DENTAL COLLEGE COMMENCEMENTS.

MARION-SIMS COLLEGE OF MEDICINE, DENTAL DEPARTMENT.

THE annual commencement exercises of the Dental Department of the Marion-Sims College of Medicine were held in the Odeon, St. Louis, Mo., April 25, 1901.

The number of matriculates for the session was one hundred and twenty-eight.

The degree of D.D.S. was conferred on the following graduates by Dr. M. C. Marshall:

Edwin E. Armstrong.....	Missouri.	V. A. Kremar, M. D.....	Missouri.
Robert O. Butts.....	Texas.	Katharine E. Lavers.....	Missouri.
Arnold E. Diehl.....	Missouri.	Frank W. Linnert.....	Missouri.
Walter Y. Eckardt.....	Missouri.	Leo Mandel.....	Missouri.
Ralph R. Edwards.....	Illinois.	Wm. G. Mefford.....	Missouri.
Claude J. Frost.....	Missouri.	Henry S. Moser.....	Missouri.
Clyde G. Hawkins.....	Missouri.	Minnie E. Pinto.....	Missouri.
Wilder H. Hawley.....	Missouri.	Eston H. Prouty.....	Iowa.
Edw. A. Hopkinson.....	Illinois.	Warren E. Rose.....	Illinois.
Oliver C. Ingram.....	Missouri.	Algy F. Strange.....	Illinois.
Arthur H. Jones.....	Missouri.	Edward A. Walker.....	Illinois.
Ernest L. Koenig.....	Missouri.	Fred. Westerfeld.....	Missouri.
Wm. A. Koons.....	Missouri.	William H. Winget.....	Illinois.

NORTH PACIFIC DENTAL COLLEGE.

THE annual commencement exercises of the North Pacific Dental College were held in the Assembly Hall of the High School, Portland, Oregon, on Thursday evening, May 2, 1901.

The number of matriculates for the session was one hundred and thirteen.

The degree of D.D.S. was conferred by S. J. Barber, D.D.S., on the following graduates:

Wm. Cavanagh.....	Oregon.	R. E. Schenk.....	Oregon.
A. S. Esson.....	Oregon.	W. W. Shartel.....	California.
F. Q. Freeburger.....	Washington.	J. H. Stewart.....	Oregon.
C. J. Jenkins.....	Washington.	N. A. Swanberg.....	Washington.
D. J. Kertchem.....	California.	A. P. Watson.....	Oregon.

SOUTHERN DENTAL COLLEGE.

THE annual commencement exercises of the Southern Dental College, department of the Atlanta College of Physicians and Surgeons, were held in the Grand Opera House, Atlanta, Ga., May 4, 1901.

The number of matriculates for the session was one hundred and two.

The degree of D.D.S. was conferred on the following graduates by Judge Howard Van Epps:

S. J. Alexander.....	Georgia.	B. R. McLaughlin.....	Georgia.
L. P. Anthony.....	Georgia.	J. O. Marshall.....	Kentucky.
S. D. Barr.....	Alabama.	E. M. Smith.....	Alabama.
John Baur.....	Texas.	F. E. Spencer.....	Georgia.
L. N. Betts.....	Georgia.	A. E. Stone.....	Georgia.
W. N. Coon.....	Florida.	F. J. Stone.....	Texas.
F. B. Hannah, Jr.....	Florida.	J. R. Tomlinson.....	Georgia.
W. W. Harden.....	Georgia.	W. L. Wall.....	Alabama.
M. D. Huff.....	Georgia.	H. A. White.....	Louisiana.
Euell Hyman.....	Alabama.	R. D. Whiteside.....	Florida.
J. M. Johnson.....	Alabama.	W. P. Williams.....	Alabama.
J. D. Jones.....	Alabama.	I. L. B. Wright.....	Georgia.
W. L. Jones.....	Alabama.	T. B. Wright.....	Mississippi.
W. C. McDowell.....	South Carolina.	C. R. Zickler.....	Texas.
D. A. McGuirk.....	Georgia.		

NEW ORLEANS DENTAL COLLEGE.

THE second annual commencement exercises of the New Orleans Dental College were held at the Tulane Hall, New Orleans, La., Monday evening, May 6, 1901.

The annual address to the graduates was delivered by John Dymond, Jr., Esq., and the valedictory by David A. Lane, D.D.S.

The number of matriculates for the session was fifty-one.

The degree of D.D.S. was conferred on the following graduates by Jules J. Sarrazin, D.D.S., dean of the faculty: D. A. Lane, Texas; C. A. Thomas, Texas; George L. Viallon, Louisiana; R. F. Waguespack, Louisiana.

BIRMINGHAM DENTAL COLLEGE.

THE annual commencement exercises of the Birmingham Dental College were held in the Jefferson Theater, Birmingham, Ala., on Thursday evening, May 9, 1901.

The valedictory address was given by J. G. Hopping, of the graduating class.

The number of matriculates for the session was forty-one.

The degree of D.D.S. was conferred by T. M. Allen, D.D.S., dean of the faculty, upon the following graduates:

E. C. Baskin.....	Alabama.	B. H. Mayer.....	Mexico.
C. R. Bibb.....	Alabama.	E. W. Murphree.....	Alabama.
Leland Caldwell.....	Mississippi.	A. R. Reid.....	Alabama.
W. A. Collins.....	Alabama.	W. A. Rickles.....	Alabama.
Lavette Cox.....	Alabama.	O. W. Sansum.....	Louisiana.
J. G. Hopping.....	Indiana.	J. O. Shaw.....	Alabama.
A. B. How.....	Alabama.	A. G. Thompson.....	Arkansas.
H. M. Jones.....	Texas.		

ATLANTA DENTAL COLLEGE.

THE annual commencement exercises of the Atlanta Dental College were held in the Grand Opera House Monday evening, May 6, 1901.

The number of matriculates for the session was one hundred and eighty-three.

The degree of D.D.S. was conferred by Judge W. R. Hammond, president of the board of trustees, on the following graduates:

Percy A. Bethea.....	South Carolina.	J. W. McNeill.....	Georgia.
J. R. Bivins.....	North Carolina.	J. P. Mobley.....	Louisiana.
J. M. Boyette, M.D....	North Carolina.	L. G. Moody.....	Louisiana.
H. F. Cann.....	Louisiana.	A. A. W. Myer.....	Tennessee.
J. A. Carlton.....	Georgia.	C. L. Passmore.....	Georgia.
W. S. Conway.....	Georgia.	H. C. Perkins.....	Georgia.
R. C. Cousins.....	Georgia.	F. W. Sally.....	South Carolina.
Young Dahlberg.....	Alabama.	R. H. Shields.....	Georgia.
J. A. DuBose.....	Alabama.	G. W. B. Smith.....	South Carolina.
Karl Frieseke.....	Germany.	Owen Smith.....	Georgia.
Eli Garrett.....	Georgia.	Rufus Smith.....	Georgia.
B. L. Graham.....	Mississippi.	W. C. Smith.....	Georgia.
W. G. Hammond....	South Carolina.	F. G. Sory.....	Texas.
P. O. Hamner.....	Alabama.	M. Stagg.....	Louisiana.
A. S. Hopkins.....	Georgia.	W. D. Vincent.....	South Carolina.
O. G. Kelley.....	Georgia.	P. R. Whitley.....	Mississippi.
W. M. Kennedy.....	South Carolina.	Bert Williams.....	Louisiana.
W. W. McCord.....	Georgia.		

NEW YORK COLLEGE OF DENTISTRY.

THE thirty-fifth annual commencement exercises were held in the hall of the Young Men's Christian Association, New York city, Monday evening, May 13, 1901.

The address to the graduates was delivered by Rev. Lindsay Parker, D.D., and the valedictory by William Frederick Johnson, D.D.S.

The number of matriculates for the session was three hundred and seventy-eight.

The degree of D.D.S. was conferred on the following graduates by Rev. George Alexander, D.D., president of the board of trustees and directors:

Gustav Adolph.....	New York.	Chas. F. Jones.....	New Jersey.
Irving L. Baker.....	New York.	Geo. H. Koegler.....	New York.
Bertram Ball.....	New York.	Wm. J. Lederer.....	New York.
Francis D. Barnes.....	New York.	Warrington G. Lewis....	New York.
Wm. H. Bentley, Jr.....	Connecticut.	Jas. A. Malcolm.....	New York.
Richard Blum.....	Austria.	Morris Mestel.....	Austria.
Bernard B. Brandeis....	New York.	Jas. L. MacNaughton....	New York.
Henry B. Camerden....	New York.	Louis Nash.....	New Jersey.
Julius E. Carlin.....	New York.	Alonzo M. Nodine.....	New York.
H. E. S. Chayes.....	New York.	Wm. H. Norris.....	New York.
Waite A. Cotton.....	New Jersey.	Britton L. Poulson.....	New York.
Thos. R. Cullin.....	New York.	Frank C. Preiss.....	New Jersey.
Samuel Danson.....	New York.	H. W. Prentice, A.B....	New York.
David S. Dillenberg....	New York.	John A. Romer.....	New York.
Wm. F. Eberth.....	New York.	Wm. Rosenbaum.....	New York.
Jacob H. Frees.....	New York.	Wm. F. Russell.....	New York.
Leo F. Giberich.....	New York.	Chas. Russianoff.....	New York.
Morris H. Glass.....	New York.	Edwin K. Sexton.....	New York.
St. Elmo N. Goetz.....	New York.	Rufus E. Smith.....	New Jersey.
Jerome R. Herzog.....	New York.	David Sterz.....	New York.
David A. Hill.....	New Jersey.	Nathan Trosky.....	New York.
Wentworth Holmes....	Connecticut.	Maier Utitz.....	Georgia.
Morgan B. Horton.....	Connecticut.	Victor C. Von Unruh....	Germany.
Wm. F. Johnson.....	New York.		

UNIVERSITY OF DENVER, DENTAL DEPARTMENT.

THE annual commencement exercises of the Dental Department of the University of Denver were held in Trinity Church, Denver, Col., May 13, 1901.

The number of matriculates for the session was forty-four.

The degree of D.D.S. was conferred on the following graduates by Henry A. Buchtel, D.D., LL.D., chancellor of the University:

H. W. Bates.....	Kansas.	J. F. Peck.....	Ohio.
C. E. Clark.....	Pennsylvania.	C. L. Rooks.....	Missouri.
Mrs. J. B. Delaney....	Missouri.	T. B. Sia.....	China.
S. S. Harvie.....	Nova Scotia.	C. L. Stapleton.....	Illinois.
S. R. Loustano.....	Colorado.	J. B. Van Evera.....	Iowa.
F. F. McAtee.....	Kentucky.	A. Winter.....	Germany.

UNIVERSITY OF CALIFORNIA, DENTAL DEPARTMENT.

THE graduating exercises of the Dental Department of the University of California, San Francisco, were held with those of the academic and other professional departments, at Berkeley, May 15, 1901, at 10 A.M.

The number of matriculates for the session of 1900-1901 was one hundred and fifty.

The address to the graduating classes was delivered by the Hon. John Hay, Secretary of State.

The degree of D.D.S. was conferred by President Benjamin Ide Wheeler upon the following members of the graduating class:

Geo. S. Aiken.....	Hawaii.	Henry B. Knox.....	California.
Domenico A. Alberti.....	California.	Leo V. Levinger.....	California.
Chas. S. Ayers.....	California.	Walter F. Lillard.....	California.
Adolph Baer, B.L., B.S....	California.	James A. Lindsay.....	California.
Julius Baer.....	California.	Edwin H. Mauk.....	California.
Thos. I. C. Barr.....	California.	James McGough.....	California.
John C. Baxter.....	California.	Jno. F. O. McMath.....	California.
Edw. L. Betterton.....	California.	Guy S. Millberry.....	California.
Samuel D. Block.....	California.	Jos. F. Novitzky.....	California.
Ralph E. Burns.....	California.	Edw. W. O'Brien.....	Nevada.
Jos. A. Carew.....	California.	Eugene De S. Painter....	California.
Jesse Chilton.....	California.	Percy S. Regnart.....	California.
Geo. S. Conner.....	California.	Edw. J. Rinckel.....	Nevada.
Archibald Y. Dick.....	California.	Guy Rogers.....	California.
Jas. S. Domeniconi.....	California.	Ralph B. Scheier.....	California.
Martin Espinosa.....	California.	Fred J. Seiferd.....	California.
Percy De W. Gaskill.....	California.	Frank W. Seydel.....	California.
Harry E. Gates.....	California.	William Shepard.....	California.
Maurice L. Green.....	California.	Fred'k W. Stapff.....	California.
Adolph K. Harshall.....	California.	Henry S. Stern.....	California.
Horace N. Henderson....	California.	John L. Sullivan.....	California.
Elwood F. Herbert.....	California.	Anna C. F. Wagner.....	Nevada.
Oliver J. Howard.....	California.	Chapman M. White, Jr....	California.
Anna L. Hudgens.....	California.	Jay F. Wilson.....	California.
Walter E. Janke.....	California.	Roy I. Woolsey.....	California.
Chas. H. Jurgens.....	Colorado.		

COLUMBIAN UNIVERSITY, DENTAL SCHOOL.

THE annual commencement exercises of the Dental School of Columbian University were held in the New National Theater, Washington, D. C., Monday evening, May 27, 1901.

The address to the graduates was delivered by D. E. De Schweinitz, M.D., of Philadelphia, Pa.

The number of matriculates for the session was seventy.

The degree of D.D.S. was conferred upon the following graduates by Samuel H. Greene, D.D., LL.D., president of the institution:

John R. De Farges... Virginia.	R. G. Richardson..... Michigan.
Albert L. Haselbarth. New Jersey.	Robert W. Rule..... Iowa.
Chas. M. Hasselbach. Pennsylvania.	Howard F. Smith..... Massachusetts.
Jas. T. McClenahan.. North Carolina.	John H. Wesler..... Connecticut.
Clinton A. Putnam... Maine.	

UNIVERSITY OF BUFFALO, DENTAL DEPARTMENT.

THE tenth annual commencement exercises of the Dental Department of the University of Buffalo were held at the Star Theater, Buffalo, N. Y., Tuesday, May 14, 1901.

The annual address to graduates was delivered by Archibald Dann, M.D., of Rochester.

The number of matriculates for the session was two hundred and eighty-three.

The degree of D.D.S. was conferred upon the following graduates by the Hon. James O. Putnam, chancellor of the university:

Chas. E. Allen.....	New York.	Graham E. Jackson.	Ontario.
Willard L. Babcock....	New York.	Frank L. Jenne.....	New York.
Harry A. Bartlett.....	New York.	Chas. J. Jewell.....	New York.
Perry Bauder.....	New York.	John M. Jones.....	Ontario.
Ella M. Bennett.....	Ontario.	Frederick W. Kühn.	New York.
Chas. J. Berrick.....	New York.	George C. Lowe.....	New York.
Roy Blanchard.....	New York.	James O. Macbeth..	Minnesota.
Reinforth J. Boddy....	New York.	Ray McCombs.....	New York.
W. E. Boughton.....	New York.	David H. McCoy....	Ontario.
Arthur E. Brooks.....	New York.	Geo. B. Mitchell....	New York.
Joseph E. Burchill....	Ontario.	Geo. T. Moore.....	New York.
Geo. A. P. Burkhart...	New York.	Chas. F. Munroe....	New York.
Herman F. Carman....	Ontario.	George A. Neil.....	Ontario.
Clayton A. Carroll....	New York.	Thos. E. Newman..	New York.
Herbert G. Collins....	Ontario.	Wade H. Prentice..	New York.
Robert J. Conway.....	New York.	Edwin M. Read....	New York.
Joseph H. Cowie.....	Ontario.	Chas. W. Richards.	New York.
Frank M. Crocker.....	New York.	Frank T. Simmons.	New York.
Wm. G. Downes.....	New York.	Levi D. Simpson...	Pennsylvania.
Hugh C. Easterbrook..	Ontario.	T. B. Smith, M.D...	New York.
Rast H. Edmonston...	New York.	Thos. S. Smith.....	Manitoba.
Preston J. Elliott.....	Ontario.	Harry J. Stewart...	New York.
Grant T. Ellwood....	New York.	Abijah A. Sullivan.	New York.
John O. Frankenstein..	New York.	Thos. C. Swift.....	New York.
Lloyd F. Glazier.....	New York.	Jos. M. Tench.....	Ontario.
Raymond J. Granger...	New York.	Alfred J. Unbehaun.	New York.
Virgil H. Griswold....	New York.	E. C. Waples, Jr...	Massachusetts.
Ferdinand Haase, Jr...	New York.	Geo. F. Weiland....	Ontario.
James Hermans.....	New York.	Theo. I. Weller....	New York.
Eddie L. W. Hewson...	Massachusetts.	Edwin Whitford, Jr.	New York.
Guy H. Hillman.....	New York.	Otis B. Whitford...	New York.
Frank C. Horton.....	New York.	H. W. Whitney....	New York.
Chas. C. Hotis.....	New York.		

UNIVERSITY OF MINNESOTA, COLLEGE OF DENTISTRY.

THE thirteenth annual commencement exercises of the College of Dentistry, University of Minnesota, were held in the Armory, Minneapolis, Minn., Thursday, June 6, 1901.

The number of matriculates was one hundred.

The degree of D.M.D. was conferred upon the following graduates by Cyrus Northrup, LL.D., president of the university:

Wm. H. Ball.....	Minnesota.	Adolf Olson.....	Minnesota.
Albin Brodeen.....	Minnesota.	Alfred Osterberg....	Minnesota.
Wilbur J. Brownlee....	Minnesota.	John E. Owens.....	Minnesota.
Harry B. Child.....	Minnesota.	Fred. W. Pepper.....	Minnesota.
Norman J. Cox.....	Minnesota.	Walter S. Rhame....	Minnesota.
Ernest E. Creelman....	Minnesota.	Will E. Sargent.....	Massachusetts.
Bror Eric Dahlgren....	Sweden.	Ai B. Smith.....	Minnesota.
Edw. J. Doheny.....	Minnesota.	Frank L. Stoudt....	Minnesota.
Henry E. Frodeen.....	Minnesota.	Cyril F. Sweet.....	Minnesota.
John L. Holmberg.....	Minnesota.	James E. Thiebaud...	Minnesota.
Carl J. Holmgren.....	Minnesota.	Thos. L. Thompson..	Minnesota.
Herman S. Jaehning....	Minnesota.	Adolf T. Thorsen....	Wisconsin.
Adam B. Jargo.....	Minnesota.	Wm. W. Woehler....	Minnesota.
Martin C. Johnson.....	Minnesota.	Wm. J. Works.....	Minnesota.
Adolf F. Moody.....	Minnesota.	Cecil F. Yates.....	Minnesota.
Orrin C. Nelson.....	Minnesota.		

UNIVERSITY OF PENNSYLVANIA, DEPARTMENT OF DENTISTRY.

THE one hundred and forty-fifth annual commencement exercises of the University of Pennsylvania were held in the Academy of Music, Philadelphia, Wednesday, June 12, 1901.

The commencement oration was delivered by the Hon. James M. Beck.

The number of matriculates for the session in the Department of Dentistry was four hundred and eighty-four.

The degree of D.D.S. was conferred by Charles C. Harrison, LL.D., provost of the university, on the following graduates:

Arthur G. Able.	Harry R. Habben.	John L. Nailos.
Percy W. Andrews.	James P. Hagerty.	Antonie P. W. Neuhaus.
Wm. H. Armstrong.	Benj. S. Hall.	John A. O'Brien.
Thos. A. Balmer.	Ernest L. Hall.	Patrick X. O'Donnell.
Geo. H. Banks.	Howard E. J. Hammond.	William Olson.
John E. Barnard.	Richard J. Hare.	Howard B. Osborn.
Wm. H. H. Beckwith.	Chas. J. Harrison.	Harry J. Parker.
Charles Beisel.	Ralph E. Hayward.	Frank J. Pearce.
Le Roy S. Blatner.	James E. Heap.	Walter L. Pearse.
Albert L. Bolte.	Albert E. Heath.	Merritt F. Phillips.
Abram L. Bower.	Wm. S. Hewitt.	Burton LeR. Pinkerton.
Louis A. Brady.	John M. Horner.	Gerald P. Pollitt.
Herbert Bristow.	Harry M. Houck.	Walter S. Quin.
Wm. P. Broderick.	John W. Houck.	Frank Read, Jr.
Thos. Buchanan, Jr.	Robt. R. Hutchison.	Francis B. Reynolds.
Edmund Buckeridge.	Louis A. Jenks.	Albert C. Rice.
Max Bullet.	Floyd LeR. Jennings.	Theo. A. Riley.
Wm. N. Butler.	Stanley L. Jordan.	Geo. S. Rothermel.
Reid Calcott.	Manley A. Joslin.	Horace T. Sadler.
Wm. J. Carshore, Jr.	Geo. E. Kattermann.	Wm. L. Schreiber, Jr.
Ross A. Clark.	Patrick H. Keaveny.	Saul L. Scott.
Victor Cochran.	John H. Kelley.	Ernest R. Sewell.
Wm. B. Creveling.	Max Kuhn.	Wm. R. Shannon.
Frank E. Crosby.	And. J. Kuhnmuench.	Everett T. Sharp.
Geo. M. Crow.	Cameron E. Lane.	Jos. I. Simpson.
Guy A. Cummings.	Walter N. Langshaw.	Arthur R. Slade.
Chas. G. Davis.	Leo L. Larrabee.	James R. Smith.
Geo. E. Davis.	Walter B. Lavelle.	Luther J. Smith.
Ernest F. Deck.	Ernst Lebram.	Alex. M. Sparks.
Samuel F. Denius.	Charlie Lees.	Scott B. Spencer.
Ambrose H. Devereaux.	John H. Lehr.	Arthur LeB. Stebbins.
Chas. A. Dickinson.	Reginald J. M. Lewis.	Leon O. Sweetser.
Chas. F. Dietz.	Jas. H. MacGregor.	George Telford.
Patrick F. Diggins.	Wm. B. McDonald.	Dwight V. Thompson.
Claude M. Dolan.	Walter H. McGoff.	Gustav P. Tismer.
Samuel Doskow.	Jas. B. McKeown.	Samuel E. Tonkin.
Edw. C. Duryee.	Chas. B. McLain.	Vernon B. Twigg.
Wm. D. Easton.	Albert E. Mann.	Morton Van Loan.
Austin C. Eberly.	Bernhard H. Mansel.	Geo. F. Walden.
Horace M. Eckman.	Louis Markwitz.	Louis G. Wallace.
Geo. L. Edelman.	Raymond Mazeine.	Wm. E. Wallace.
Joseph Erwin.	Frank H. Mead.	Malcolm Warrack.
Fred. W. Fairthorne.	Thos. K. Means.	Herbert M. Weaver.
Wm. M. Fine.	Clyde V. Mierley.	Henry W. Weirick.
Chas. F. E. Fiset.	Kyle W. Miller.	Wm. D. White.
Harry K. Fison.	Orville J. Molyneaux.	Royal E. Wight.
Jos. E. Flanagan.	Louis Monet.	Henry B. Winter.
Robert E. Flory.	Thos. T. Moore, Jr.	George F. Witte.
Chas. S. Fowler.	Omar O. Moorhead.	Clayton P. Wolcott.
Frank A. Fox.	Etienne C. L. Morin.	Frank E. Woodley.
Frank B. Garner.	Harry C. Moxham.	Owen Woolley.
Oak S. Gribble.		

MEDICO-CHIRURGICAL COLLEGE, DEPARTMENT OF DENTISTRY.

THE commencement exercises of the Department of Dentistry of the Medico-Chirurgical College were held in the Academy of Music, Philadelphia, May 25, 1901.

The doctorate oration was delivered by the Rev. Ethelbert Dudley Warfield, D.D., LL.D., president of Lafayette College.

The degree of D.D.S. was conferred on the following graduates by ex-Chief Justice Edward M. Paxson, president of the board of trustees of the institution:

Ellsworth Armstrong....	Pennsylvania.	Stanley A. Ireland.....	New Jersey.
James C. Attix.....	Pennsylvania.	Robert Kirshner.....	Pennsylvania.
Maxie J. Becnel.....	Louisiana.	David M. Sanders.....	Pennsylvania.
Samuel I. Callahan.....	New Jersey.	Robert M. Schaffer....	Pennsylvania.
Morris H. Chann.....	Russia.	Joseph Scott.....	Pennsylvania.
Wm. E. Davis.....	Pennsylvania.	Chas. T. Searle.....	Minnesota.
Arthur R. Dray.....	England.	Michael Shapiro.....	Austria.
Louis J. Gelpi.....	Louisiana.	Cahall Sipple.....	Delaware.
Robert B. Gillars.....	Pennsylvania.	Richard D. Steim.....	Pennsylvania.
Wm. H. Gwinnutt.....	England.	Edgar D. Urich.....	Pennsylvania.
Iskander A. Hajjar.....	Syria.	J. T. Woolfe.....	Pennsylvania.
Chas. M. Hollis.....	Delaware.	Pascal W. Yearsley....	Pennsylvania.
Edw. C. Hughes.....	Pennsylvania.		

DETROIT COLLEGE OF MEDICINE, DENTAL DEPARTMENT.

THE annual commencement exercises of the Detroit College of Medicine, Dental Department were held in the Light Guard Armory, Detroit, Mich., Thursday evening, June 13, 1901.

The address to the graduates was delivered by Prof. Theodore A. McGraw.

The degree of D.D.S. was conferred by the Hon. Sidney D. Miller, president of the college, upon the following graduates:

T. C. Bartholomew.	C. R. Ellis.	L. B. Neuhausel.
J. Carberry.	F. R. Foster.	R. G. Pearce.
J. T. Chriselius.	W. A. Giffen.	C. M. Quale.
W. H. Cooper.	L. E. Heasley.	E. L. Roach.
W. H. Conboy.	A. W. Hess.	N. C. Rose.
D. E. Cummings.	O. C. Howson..	J. O. Scott.
W. W. Cunningham.	W. E. Johnson.	M. A. Sughrow.
J. H. Cunningham.	R. N. Kreuter.	R. J. Tick.
C. K. Davis.	Mrs. M. A. Lapham.	A. G. Ward.
B. Dinius.	N. W. Morgan.	H. J. Watson.
A. E. Dudley.	D. MacKellar.	H. B. Weller.
A. P. Dunn.	T. H. McKenzie.	

COLLEGE OF DENTISTRY, UNIVERSITY OF SOUTHERN CALIFORNIA.

THE annual commencement exercises of the College of Dentistry, University of Southern California, were held in the Los Angeles Theater, Los Angeles, Cal., Tuesday, June 11, 1901.

The number of matriculates for the session was sixty-two.

The degree of D.D.S. was conferred by Edgar Palmer, D.D.S., dean of the faculty, upon the following graduates:

F. N. Arnold.....	California.	E. H. Lyman.....	California.
A. B. Austin.....	California.	A. D. McLeod.....	California.
J. C. Barney.....	Minnesota.	J. W. Morrison.....	California.
A. B. Brown.....	Illinois.	W. E. Neel.....	Illinois.
E. B. Buell.....	California.	M. E. Osborne.....	California.
W. T. Covington.....	California.	A. W. Rannells.....	California.
Alonzo Grimes.....	California.	C. E. Rice.....	California.
E. M. Harwood.....	California.	M. E. Snively.....	California.
A. C. Holladay.....	California.	S. M. Takagi.....	Japan.
W. F. Huff.....	California.	Dr. A. G. Toprahanian..	California.
F. C. Langdon.....	Iowa.	Dr. R. Wagner.....	Washington.

WESTERN RESERVE UNIVERSITY, COLLEGE OF DENTISTRY.

THE annual commencement exercises of the Western Reserve University were held Thursday, June 13, 1901, in Cleveland, Ohio.

The number of matriculates for the session was one hundred and two.

The Rev. Josiah Strong, D.D., of New York, delivered the address to the graduates.

President Chas. F. Thwing, of the university, conferred the degree of D.D.S. upon the following graduates:

Lewis D. Aldrich.....	Ohio.	Delbert H. Henninger..	Ohio.
Roy E. Belden.....	Ohio.	Geo. F. Hitchcock.....	Ohio.
Robt. B. Chamberlin...	Ohio.	Barry C. Holmes.....	Ohio.
Willard F. Chapin.....	Ohio.	Arthur W. Maxwell....	Ohio.
Alvin J. Endle.....	Ohio.	Algernon Payne.....	Ohio.
Floyd W. Finch.....	New York.	Samuel W. Rice.....	Ohio.
Chas. B. Fletcher.....	Ohio.	Clarence O. Shepherd..	Ohio.
John B. Gillette.....	Ohio.	Wm. A. Sproull.....	Pennsylvania.
Wm. J. Gillie.....	Ohio.	Hamilton F. Strong....	Ohio.
Chas. V. Gougler.....	Ohio.	Archie B. Wallace.....	Pennsylvania.
Jos. P. Henaham.....	Ohio.	Louis F. Wasson.....	Ohio.

DENTAL SOCIETY ANNOUNCEMENTS.

MAINE BOARD OF DENTAL EXAMINERS.

A SPECIAL meeting of the Maine Board of Dental Examiners will be held for examination of applicants, in Portland, Monday, July 15, 1901.

D. W. FELLOWS, M.D., *Sec'y*,
Y. M. C. A. Bldg., Portland.

WEST VIRGINIA STATE BOARD OF DENTAL EXAMINERS

THE West Virginia State Board of Dental Examiners will meet at the Jackson Hotel, in the city of Parkersburg, August 7, 8, and 9, 1901, for the examination of candidates. The examination will be in writing and will cover all the branches taught in representative schools, together with opera-

tions in the mouth. Applicants for examination are required to furnish their own instruments and materials. Application blanks will be furnished to all those wishing to take the examination. Such blanks should be in the hands of the secretary not later than July 25th. Previous examination questions will not be furnished.

W. E. MINGHINI, *Sec'y*,
Martinsburg, W. Va.

VIRGINIA STATE DENTAL ASSOCIATION.

THE annual meeting of the Virginia State Dental Association will convene at Natural Bridge, Va., on August 1, continuing August 2 and 3, 1901.

F. W. STIFF, D.D.S., *Ch'n Ex. Com.*,
Richmond, Va.

MINNESOTA STATE DENTAL ASSOCIATION.

CHANGE OF DATE OF MEETING.

THE eighteenth annual meeting of the Minnesota State Dental Association will be held in Duluth, Minn., Tuesday, July 30, Wednesday, July 31, and Thursday, August 1, 1901, instead of on dates previously announced.

NATIONAL ASSOCIATION OF DENTAL FACULTIES.

THE meetings of the National Association of Dental Faculties convening in Milwaukee, Friday, August 2, 1901, will be held in the Hotel Pfister. Committee rooms and the necessary accommodations will be furnished by the hotel.

S. W. FOSTER, *Sec'y Ex. Com.*, N. A. D. F.

INTERNATIONAL DENTAL FEDERATION.

NOTICE AS TO THE MEETINGS IN ENGLAND.

A MEETING of the sub-committee of the Executive Council of the International Dental Federation was held in Paris on May 27, 1901. At this meeting the following measures were decided upon:

1. The proposed meetings in England this year will be held at the time of the annual meeting of the British Dental Association.

NOTE.—The annual meeting of the British Dental Association will be held on Saturday, August 3, Monday, August 5, and Tuesday, August 6, 1901. The social headquarters will be at the Hotel Cecil, London (special tariff).

2. The Executive Council will examine at a preliminary meeting in London on Sunday morning, August 4, the proposed regulations for the International Dental Federation which the sub-committee is charged to prepare.

3. The International Committee on Education will also hold a first meeting on the same day in London.

4. The International Committee on Education will meet again at Cambridge on Wednesday, August 7, at the conclusion of the meeting of the British Dental Association.

5. A second meeting of the Executive Council will be held on Wednesday,

August 7th, after the meeting of the International Committee on Education to conclude business.

6. A general meeting of the Executive Council and of the International Committee on Education will take place on Wednesday, August 7th, at Cambridge. To this meeting the delegates of the national committees, the delegates of the societies, and the members of the societies and national federations which took part in the constitution of the Congress of 1900 are invited. Other visitors will be especially invited by the Executive Council.

7. The last meetings will be held within the precincts of the University of Cambridge.

8. A special banquet will terminate this first session of the International Dental Federation.

9. Delegates may be appointed by the Executive Council, by the federations, or by national societies.

10. Notices of convocation, containing the orders of the day for the various meetings and all other necessary instructions, will be sent out at a later date.

For all information apply to Dr. Sauvez, general secretary of the Executive Council, 45 rue de la Tour-d'Auvergne, Paris.

NATIONAL DENTAL ASSOCIATION.

THE fourth annual meeting of the National Dental Association will be held in Milwaukee, Wis., commencing Tuesday, August 6, 1901, and continuing four days. The Masonic Temple hall, which is conveniently located and especially suited to the various needs of the association, has been secured.

A special railroad rate of one fare and a third has been secured on all roads, on the certificate plan. Tickets may be bought from July 31st to August 6th, good to return up to August 14th.

All regularly organized dental associations are entitled to one delegate for each ten members, and these associations are urged to send full delegations.

Dr. G. V. I. Brown, of Milwaukee, chairman of the local committee, will engage rooms at the hotels and answer questions regarding local arrangements.

G. V. BLACK, *President*,
J. D. PATTERSON, *Chairman Ex. Com.*,
A. H. PECK, *Secretary*.

NATIONAL DENTAL ASSOCIATION, SOUTHERN BRANCH.

THE Southern Branch of the National Dental Association will hold its fourth annual meeting July 29, 1901, at Nashville, Tenn. Hotel rates: Tulane, best room, \$2.00 per day; Maxwell, good rooms, without bath, \$2.50; Duncan, \$2.50.

One and one-third fare rate, certificate plan, has been secured by special kindness on the part of the railroad. Those who wish to attend the meeting of the National Dental Association, which convenes at Milwaukee August 6, 1901, can get the full benefit of this certificate privilege by depositing the same with the Union ticket agent at time of purchase of

ticket to Milwaukee. On returning to Nashville, homeward bound, call for your certificate, and the agent will provide you with a ticket for one-third the usual rate, provided you return to Nashville on or before August 15th.

C. L. ALEXANDER, Charlotte, N. C.,

THOS. P. HINMAN, Atlanta, Ga.,

Cor. Sec'y S. B. N. D. A.

President S. B. N. D. A.

THE MILWAUKEE MEETINGS.

THE profession from the Eastern section who expect to attend any or all of the National meetings at Milwaukee in August, are requested to at once send their names to Dr. H. J. Burkhart, of Batavia, N. Y. It is expected that a rate war between the railroads will be on at that time, of which advantage will be taken. An arrangement can be made for a stop of several days at the Pan-American Exposition, at Buffalo, on the return trip.

EDITORIAL.

THE NATIONAL MEETINGS.

WE have from time to time called attention to the great professional importance of the work of the annual national dental meetings. This year the meetings will be called upon to do work which will have a direct bearing upon the status of dentistry in this country, and which will affect it for good or ill.

In a broad sense, the function of all these meetings is legislative in character. The National Dental Association is the arena in which the newer developments in theory and practice are presented and subjected to the critical analysis of debate; much of the chaff is sifted out in the course of discussion, and that which is of permanent value is preserved for dissemination and practical use. Standards of dental practice are thus established for the good of all, and it is each man's duty to aid by his presence and counsel in seeing that these standards are correct.

Of equal, if not greater, importance is the legislative work to be done by the National Association of Dental Faculties and by the Dental Examiners. Never before in the history of dentistry have the abuses of the licensing power been so prominently brought before the public and the profession as during the past year. The issuance of fraudulent diplomas under lax dental laws has created a world-wide scandal, and drawn upon us the criticism of all nations for permitting the conditions to exist that make that crime possible. It is openly asserted that the National Association of Dental Faculties is half-hearted in the enforcement of its own regulations; that,

notwithstanding its ruling as to preliminary educational requirements, the rule is disregarded, and that the association does not enforce its own regulations in cases where these are disregarded. It is high time either that these criticisms were disproved or that a thorough house-cleaning were done. If our national dental legislative bodies fail to correct the evils so openly complained of, the profession that respects itself, that has faith in the ultimate triumph of high professional standards and professional ethical integrity, will demand, as has been already suggested, that these matters be intrusted to the care of the police power of the state. Early in August, and while our national bodies are in session, a meeting will be convened in London, at which will be represented the dental educational interests of the principal nations of the earth, for the purpose of arranging educational standards which it is hoped may prove worthy of universal acceptance. In that congress of national dental interests the educational system and standards of America will be subjected to critical scrutiny, and on that occasion the necessity that no stain should tarnish our escutcheon is of paramount importance. The solution of these questions on the side of right and professional honor demand the presence, the unselfish and intelligent co-operation, of every man who has the success of his profession at heart. Let the meetings at Milwaukee be made memorable by the overwhelming testimony of numbers that those higher elements of professional character upon which alone true success is based are not dormant among us.

JACK HORNER.

THE character of this well-known hero of the nursery has not received the serious consideration to which in our judgment its intrinsic interest entitles it. The brief but comprehensive account of the principal incident of his career, and upon which his claim to a niche in the Valhalla of immortals was based, has appealed with absorbing interest to at least as large an audience as any other figure in legend or history, and we have reason to believe that his influence in shaping the characters and destiny of mankind has been in direct ratio to his popularity.

It will be remembered that—

“Little Jack Horner
Sat in a corner,
Eating his Christmas pie;
He put in his thumb
And pulled out a plum,
And said, ‘What a brave boy am I!’ ”

A legend current in Somersetshire, England, clothes the character of Jack Horner with a certain historic verisimilitude, in effect that when the monasteries of Wells were seized by the commissioners, the Abbot of Glastonbury decided that the safest way to transfer the title-deeds was to inclose them in a pie and send them thus concealed as a present to one of the commissioners in London. Jack Horner, a lad, the son of poor parents living in the neighborhood, was selected as a trusty messenger, and one least likely to arouse suspicion, to deliver the pie and its valuable contents. Overtaken on the way by the pangs of hunger, he yielded to the temptation to break the crust, and thus discovered the character of the confection. He abstracted one of the papers, a plum which proved to be the title-deed of Wells Abbey, and the paper was found years afterward in possession of the Horner family.

It is, however, a matter of secondary importance whether the Jack Horner of the nursery is an historical entity or not, for it is, after all, the hero of the nursery whose realism has made an impression so profound that his influence is rarely shaken off, and then only through the educating effect of a wide experience and training.

Two phases of Horner's character present themselves for analysis: First, the pie-eating phase; and, second, Horner as a discoverer. Viewed simply as a consumer of pie, our hero appeals to us only in so far as he gives us the one touch of fellow-feeling which makes us wondrous kind; he is simply the aimless hungry boy, to whom time and circumstance have not as yet given the hint which is to determine his path to future greatness. We sympathize with his animal instinct of hunger as he trudges along on his weary errand, with its pittance of reward when his task is finished. Our childish sympathies have drawn the veil of charity over the breach of trust which the pangs of hunger and the wooing fragrance of the tasty pie combined in tempting him to commit, but there is nothing revealed by his character up to this point which lifts it above the level of a low mediocrity at best. The sudden transition which the action of the legend undergoes with the discovery of the plum as its pivotal incident, brings with it the revelation of a characteristic in the hero unsuspected by the reader, as it probably was by the hero himself. It is noteworthy that the discovery of the plum was literally a discovery in the strictest definition of that term. It was not the result of any preconceived notion or based upon any hypothesis as to the possible existence of a plum in the interior of his pie, but an unmistakable case of coincidence and dumb luck. Horner was not a philosopher, nor yet was he an

inductive reasoner; his plum came to him not because he was looking for plums, but because, in the course of nature, he was eating pie. He was evidently incapable of that scientific use of the imagination, that logical reasoning power, which would enable him either to prognosticate the existence of the concealed plum or to justly appreciate the nature of his discovery after he had made it. That he had even the slightest conception of the nature and magnitude of his discovery is doubtful. The legend is not only silent upon that important point, but hastens to set forth the one and only result of it—namely, its effect upon Horner's mind—by recording his exclamation, the embodiment of the vanity which was his dominant emotion, "What a brave boy am I!"

Whether the early impression made upon the developing mentality of the human race by this hero of the nursery is responsible for the persistence of Horner's attributes as a racial feature, or whether Jack Horners are, like poets, *nascitur non fit*, may be difficult to determine, but certain it is that the reaction which a discovery provokes in the character of the discoverer is often closely similar to that manifested in Horner's case. Instances are not wanting, even in the profession of dentistry, where the accidental discovery of some new idea or thing has transformed the unhappy discoverer from a peaceable, amiable, and respectable practitioner into an intolerable colossus of vanity, obnoxious to himself and those with whom he comes into contact. His craving for the adulation upon which his vanity feeds becomes the mastering principle of his life, and he dies as the fool dieth. But a milder modification of Hornerism often manifests itself in those whose *amour propre* is less highly developed, or possibly to no greater extent than what may be considered the normal degree. Some plum of discovery is extracted from the pie of the unknown, and the admiring Horner, blinded with the contemplation of his prize, quickly concludes that nature expended all of her energy in the one creative act which produced the particular plum in question. Other plums may pass before his eyes, but he sees them not, for the brilliancy of his own achievement has blinded him to all else beside. He becomes the man of one idea, by which he thereafter accounts for all natural phenomena, and sets up his hobby as the standard by which all other things are measured or explained.

It may be true that it takes all kinds to make a world,—i.e., the world as we now find it,—but it seems equally true that if the element of Hornerism were eliminated we would have a better and more rapidly progressive world. In dentistry the elimination of Hornerism would carry out with it much of the controversy regard-

ing the etiology of pyorrhea, of caries, of erosion, etc., purify our literature and our dental society reports of the polemics and diatribes concerning methods of treatment, cavity preparation, dental education, and legislation. It would broaden our view by directing attention to the ideas of others, and help us to justly estimate their importance and value. Indeed, the elimination of that self-centered tendency to magnify the importance of our own work would to a large extent make the critical judgment of others unnecessary.

We hold Mr. Horner responsible for many unpleasant incidents and much that has been a drawback and detriment to the progress of the human race, including in a special sense the dental profession as being one of the spheres of his direct influence. His exploit should be eliminated from the literature of the nursery, for its effect upon the infant mind is undoubtedly as pernicious as it is indelible. We have taken occasion to turn the light of truth upon his character with the hopeful assurance that when once his baneful influence is recognized he will be banished from among us, and that the dental profession will inaugurate a reform which shall cause the memory of Horner to wither and his name to be forgotten.

ONCE AN EDITOR, ALWAYS AN EDITOR.

WE are pleased to learn officially that Dr. J. Edward Line, of Rochester, has assumed the editorial management of the *Dental Office and Laboratory*, published by Messrs. Johnson & Lund.

We have missed Dr. Line's work in the editorial field since the publication of the *Odontographic Journal* was discontinued in January, 1897, and we most cordially welcome him again to the ranks of dental editors, with the full assurance that not only the *Dental Office and Laboratory*, but the dental profession, will be benefited by the new relation.

U. S. ARMY DENTAL SURGEONS CORPS.

FOLLOWING is a list of the candidates who have thus far successfully passed the examinations for appointment as dental surgeons in the United States army service:

SIEBERT D. BOAK, West Virginia. National University, Dental Department.

CLARENCE E. LAUDERDALE, New York. University of Buffalo, Dental Department.

F. F. WING, Montana. Northwestern University Dental School.

GEO. L. MASON, Massachusetts. Boston Dental College.

WM. H. WARE, California. University of California, Dental Department.

HUGO C. RIETZ, Wisconsin. Chicago College of Dental Surgery.

RALPH W. WADDELL, Ohio. University of Pennsylvania, Dental Department.

JEAN C. WHINNERY, Nebraska. University of Pennsylvania, Dental Department.

FRANK H. WOLVEN, New Jersey. Columbian University Dental Department.

DENTAL NECROLOGY, 1891-1900.

IN the August number of the DENTAL COSMOS, 1880, and in the issue for January, 1891, we published a list of those in or connected with the dental profession who had died within the previous decades respectively. We here publish a like list covering the ten years 1891 to 1900, inclusive.

Some of those included may be names which never achieved national prominence, and possibly the names of some whose services to the profession earned them the right to be considered eminent may have been omitted; the following compilation, however, includes all whose obituary notices have appeared in the DENTAL COSMOS or other dental journals, our purpose being to place the dates of their decease where they will be convenient for reference.

	DATE OF DEATH.		DATE OF DEATH.
Abbott, Frank.....	April 20, 1897.	Berggren, Franz	July 8, 1892.
Abbott, Jared T.....	June 28, 1899.	Bertheaux, Madame	—, 1897.
Adams, Wm. C.....	—, 1899.	Betts, L.....	—, 1894.
Allen, E. M.....	May 1, 1894.	Birchmeier, F. H.....	Sept. 8, 1893.
Allen, John	Mar. 8, 1892.	Birdsall, H. A.....	Dec. 13, 1892.
Allport, Walter W.....	Mar. 21, 1893.	Birge, Manning A.....	Oct. 7, 1898.
Amer, Wm. N.....	Sept. 20, 1899.	Blackeney, Henry F.....	Mar. 13, 1897.
Arrington, Wm. T.....	April 26, 1900.	Blackwell, Walter E.....	—, 1897.
Ash, George Claudius..	Jan. 17, 1892.	Boice, Alonzo	Feb. 2, 1898.
Atkinson, Wm. F.....	Mar. 30, 1891.	Bonney, Frank J.....	Dec. 10, 1899.
Atkinson, Wm. H.....	April 2, 1891.	Bonwill, W. G. A.....	Sept. 24, 1899.
Austin, Aaron M.....	June 2, 1899.	Bowers, Geo.....	Dec. 29, 1893.
Austin, John W.....	May 4, 1900.	Bradley, L. B.....	April 17, 1900.
Avery, Henry	Oct. 31, 1896.	Brady, Freeman	April 1, 1899.
Baab, Geo. W.....	June 3, 1898.	Bridge, W. W.....	Jan. 15, 1900.
Baker, Everett M.....	Feb. 3, 1896.	Brown, Augustus W....	July 5, 1895.
Ballou, N. E.....	Feb. 27, 1899.	Brown, Chas. De C....	July 12, 1896.
Bange, Faber	April 14, 1895.	Brown, Geo. C.....	—, 1897.
Baxter, Edwin C.....	July 14, 1895.	Brown, Seneca B.....	Jan. 5, 1897.
Baynes, Robt. B.....	Sept. 30, 1894.	Brown, Thomas R....	Mar. 5, 1900.
Bazier, A. J.....	Jan. 22, 1892.	Brush, D.....	Feb. 10, 1895.
Beach, Joel M.....	May 8, 1900.	Bryan, Thos. K.....	Nov. 17, 1894.
Beale, Alonzo P.....	Jan. 4, 1893.	Buckland, A. W.....	Aug. 2, 1900.
Beale, Stephen T.....	Dec. 12, 1899.	Bull, A. D.....	—, 1893.
Beals, Jos.	Mar. 27, 1896.	Burchard, Henry H....	June 25, 1900.
Beckwith, N. Malon...	Nov. 6, 1894.	Burras, T. H.....	Mar. 6, 1893.
Beers, W. Geo.....	Dec. 26, 1900.	Busey, J. Clarence.....	Nov. 5, 1899.
Belisario, Jno.....	June 17, 1900.	Bush, Wm. Noble.....	Feb. 3, 1893.
Bennett, O. G.....	July 28, 1899.	Buzzard, John W.....	July 27, 1891.

	DATE OF DEATH.
Caldwell, Robt. G.	Feb. 23, 1900.
Call, E. B.	—, 1896.
Cameron, J. G.	Mar. 5, 1892.
Cannon, Chas. M.	Jan. 11, 1899.
Carpenter, E. R. E.	Mar. 20, 1891.
Carroll, Robt. A.	Oct. 6, 1895.
Case, Isaac M.	Sept. 23, 1893.
Catching, Benj. H.	Nov. 23, 1899.
Chadduck, J. W.	May 30, 1895.
Chandler, Thos. H.	Aug. 27, 1895.
Chapman, Albert N.	Mar. 23, 1898.
Charles, James	Jan. 6, 1892.
Chase, Henry S.	Jan. 11, 1898.
Clark, Edw. C.	Feb. 25, 1900.
Close, Simeon L.	June 10, 1899.
Clowes, J. W.	Sept. 9, 1900.
Codman, Benj. S.	Feb. 22, 1894.
Coggins, E.	Mar. 19, 1893.
Cogswell, H. D.	July 8, 1900.
Colton, Aaron	July 14, 1894.
Colton, Gardner Q.	Aug. 9, 1898.
Conwell, Amasa F.	July 6, 1895.
Cooke, George L.	Aug. 3, 1900.
Crignier, Henri	—, 1895.
Cross, Cyrus W.	June 25, 1895.
Cushing, Geo. H.	May 25, 1900.
David, Th.	—, 1892.
Davison, Ferdinand ...	Feb. 2, 1900.
Deason, Wm.	July 26, 1891.
Deschauer, F. A.	Jan. 4, 1900.
De Trey, Emil A.	Aug. 4, 1898.
Dick, W. A.	Sept. 6, 1895.
Dickey, Samuel J.	Jan. 4, 1894.
Dickinson, C. E.	—, 1894.
Dix, Cinis	Jan. 18, 1891.
Dixon, Franklin M.	June 4, 1893.
Dodge, Clarence M.	June 22, 1899.
Dodge, J. Smith.	April 28, 1893.
Dodge, Miles H.	—, 1892.
Douglas, H. A.	—, 1892.
Downey, Neil	June 6, 1900.
Dubois, Paul	April 5, 1896.
Dudley, Albion M.	Mar. 7, 1899.
Dunaven, Harry G.	May 29, 1892.
Dunn, Wm. E.	Dec. 30, 1894.
Dwinelle, Wm. H.	Feb. 13, 1896.
Dwyer, Daniel	Nov. 7, 1890.
Eames, Wm. H.	Mar. 28, 1894.
Edwards, Surry L.	Nov. 12, 1898.
Eisenbrey, J. L.	Aug. 20, 1895.
Elliott, Walter S.	June 27, 1897.
Elliott, Wm. H.	Mar. 27, 1894.
Ellsworth, Albert H.	Feb. 5, 1899.
Emerson, John W.	Feb. 8, 1892.
Evans, Philander	Feb. 10, 1893.
Evans, Thos. W.	Nov. 14, 1897.
Finney, E. J.	—, 1899.
Finnigan, Lawrence.	July 25, 1900.
Fisher, A.	June 30, 1892.
Fisher, Henry	—, 1893.
Fisher, John W.	Feb. 11, 1897.
Fisk, Louis H.	May 8, 1900.
Fitch, Henry H.	May 2, 1895.

	DATE OF DEATH.
Fitts, Homer L.	July 18, 1895.
Fogg, Isaac S.	Nov. 23, 1895.
Foltz, J. Francis.	Dec. 3, 1890.
Fouke, Geo. S.	April 9, 1896.
Fowler, J. F.	July 23, 1891.
Fox, Charles J.	Jan. 4, 1896.
Freeman, A. W.	Feb. 23, 1899.
Fuller, Ephraim D.	April 5, 1891.
Gage, Arthur R.	June 3, 1898.
Gammon, Geo. C.	Feb. 25, 1895.
Garber, Samuel A.	Sept. 1, 1892.
Garretson, James E.	Oct. 26, 1895.
Garrison, G. B.	May 6, 1895.
Gaylord, C. M.	Mar. 12, 1895.
Geran, J. P.	Mar. 28, 1899.
Giddings, W. F.	Oct. 13, 1894.
Gildea, B. M.	Mar. 11, 1900.
Gillen, Fred. W.	Jan. 23, 1892.
Gish, Samuel	Aug. 2, 1900.
Gledhill, Thos. C.	July 28, 1900.
Godfrey, Walter J.	April 19, 1894.
Goodrich, Jos. C.	Nov. 29, 1899.
Graham, Arthur St. C.	June, 1893.
Graham, Harvey W.	July 24, 1893.
Grasse, John C.	June 10, 1893.
Grattelo, Jos. E.	Dec. 18, 1894.
Greer, Jas. C.	Nov. 25, 1898.
Gregg, Wm.	Sept. 12, 1900.
Gregory, N. B.	Sept. 23, 1894.
Griswold, W. F.	—, 1893.
Grossman, E. A.	July 30, 1894.
Grout, Chas. P.	Oct. 8, 1891.
Gutelius, Sam'l G.	July 30, 1895.
Guttman, Julius	Feb. 27, 1893.
Haas, Isaiah	June 6, 1899.
Hadley, Byron F.	Nov. 16, 1899.
Haley, Thos.	May 10, 1892.
Hand, Milton F.	April 19, 1891.
Harrington, Dan'l G.	June 13, 1899.
Harris, E. Nathan.	Mar. 12, 1893.
Harris, Oliver F.	April 21, 1892.
Hart, E. W.	Mar. 1, 1894.
Hassell, Samuel	Mar. 15, 1895.
Hawes, A. C.	April 7, 1895.
Hawes, Nathaniel W.	April 1, 1900.
Hawk, W. E.	Dec. 17, 1899.
Hawley, C. E.	June 9, 1891.
Hayden, A. G.	—, 1897.
Hayes, Samuel J.	June 10, 1897.
Hayhurst, J.	—, 1899.
Haynie, David E.	Nov. 29, 1899.
Hazelton, E. G.	Oct. 22, 1899.
Henry, Charles	Aug. 22, 1894.
Hertz, G. E.	Sept. 16, 1891.
Hess, Bernard	Dec. 23, 1900.
Heywood, Robt. R.	Feb. 13, 1894.
Hill, Hiram	July 12, 1899.
Hinds, W. H. H.	Nov. 20, 1899.
Hitchcock, Daniel K.	July 25, 1895.
Hitchcock, Edw. B.	Jan. 26, 1900.
Hodgen, Isaac N.	Nov. 29, 1895.
Hoffman, Geo. W.	April 7, 1900.
Hoine, Solomon	Feb., 1891.

DATE OF DEATH.	DATE OF DEATH.
Holbrook, E. A. April 21, 1897.	McIntosh, L. D. Mar. 1, 1892.
Holbrook, Wm. S. Nov. 5, 1893.	McLeod, Eugene V. Nov. 24, 1897.
Holt, John W. Oct. 9, 1894.	McQuaig, W. A. Nov. 12, 1894.
Hooper, James Mar. 28, 1893.	McSherry, Edw. C. May 8, 1900.
Hooper, Josephus Dec. 18, 1899.	Macalaster, O. P. May, 1891.
Hoopes, Wm. H. Jan. 30, 1895.	MacNally, Geo. June 22, 1898.
Houser, J. A. Nov., 1892.	Magill, Wm. E. May 26, 1895.
Hovey, E. April 19, 1898.	Magitot, E. —, 1897.
Howe, Seth W. May 12, 1900.	Main, O. G. Mar. 1, 1895.
Howe, Wm. A. Jan. 31, 1894.	Main, S. A. April 10, 1895.
Hunt, C. F. —, 1892.	Mallery, H. M. Feb. 20, 1900.
Hunt, Phineas G. C. April 24, 1896.	Marshall, F. C. April 29, 1892.
Huntington, John D. Sept. 15, 1900.	Marshall, Wm. H. Sept. 21, 1899.
Hurlbut, C. S. Jan. 6, 1900.	Martin, J. A. April 18, 1897.
Hyde, Geo. Sept. 10, 1893.	Mason, Geo. L. Mar. 12, 1895.
Ingersoll, L. C. May 24, 1897.	Mayer, J. A. Oct. 5, 1897.
Jennings, D. R. Oct. 29, 1897.	Maynard, Edward May 4, 1891.
Jewett, Benn C. Jan. 24, 1891.	Mayo, Urial K. Mar. 9, 1900.
Johnquest, Chas. H. June 28, 1895.	Medd, T. R. Dec. 28, 1898.
Johnson, Wm. L. —, 1898.	Meisgeier, J. W. Mar. 31, 1893.
Johnston, Silas B. July 8, 1899.	Miles, G. S. —, 1893.
Jones, Charles S. Aug. 20, 1899.	Miller, Archibald Mar. 16, 1900.
Jones, J. N. Aug. 13, 1900.	Miller, J. C. Nov. 9, 1899.
Kearns, Charles R. Jan. 16, 1900.	Milligan, G. C. April 17, 1893.
Keith, Hervey H. Jan. 26, 1899.	Miner, Geo. B. June 16, 1895.
Kelley, J. C. Feb. 4, 1900.	Menges, Theo. June 1, 1900.
Kells, Chas. E., Sr. Feb. 1, 1896.	Moffatt, Geo. T. April 2, 1895.
Kells, Oliver Oct. 24, 1899.	Moloney, T. B. Jan. 17, 1900.
Kendall, C. N. —, 1893.	Moore, H. N. Oct. 20, 1894.
Kennedy, Frank H. May 28, 1900.	Moore, John S. July 28, 1894.
Kennicott, J. A. May 12, 1893.	Moore, Wm. A. Mar. 21, 1900.
Kesler, Jas. W. Oct. 10, 1899.	Morrison, Wm. N. Dec. 20, 1896.
Kidder, A. S. July 5, 1896.	Mouzon, Henry J. July 13, 1892.
Kidder, Jas. H. June 6, 1900.	Musgrove, Thos. H. April 1, 1895.
Kimball, J. Albert. Aug. 16, 1892.	Neall, Daniel Jan. 6, 1894.
King, Courtland Nov. 4, 1897.	Neall, E. Henry. July 8, 1900.
Kingsbury, Chas. A. Oct., 1891.	Nelson, E. M. Sept. 15, 1899.
Kingsbury, W. B. —, 1893.	Newington, Henry. Oct. 11, 1895.
Kingsley, Chas. W. Oct. 22, 1893.	Newman, J. L. June 14, 1900.
Kinney, J. H. April 18, 1896.	Nixon, A. L. May 10, 1900.
Kneeland, R. A. April 13, 1899.	Norton, M. E. —, 1893.
Knox, J. Warner. April 23, 1897.	Noyes, C. F. April 22, 1900.
Koecker, L. R. May 6, 1896.	O'Connor, M. J. Aug. 6, 1898.
Kulp, Wm. O. Jan. 12, 1895.	O'Daniel, A. Jan. 8, 1895.
Lapham, Wm. B. Dec. 12, 1894.	Osborn, F. M. Aug. 30, 1894.
Larmer, S. P. Feb. 19, 1900.	Osgood, Chas. H. —, 1893.
Lathrop, Jos., Sr. Dec. 4, 1900.	Osmun, Sedgwick R. July 18, 1900.
Lawrence, Ambrose. April 23, 1893.	Overholser, Frank July 28, 1891.
Lawrence, Pliny I. Mar. 2, 1900.	Paredes, G. Vargas. May 7, 1900.
Leach, Dwight W. Sept. 2, 1895.	Parke, Edgar Aug. 12, 1892.
Leseur, Horatio Dec. 23, 1891.	Parmly, H. C. —, 1894.
Levy, Frederick A. Mar. 21, 1893.	Parsons, Ralph A. April 3, 1891.
Lewis, Geo. G. —, 1891.	Pasedach, Herman R. April 2, 1892.
Lilly, W. R. June 7, 1892.	Patrick, John J. R. April 10, 1895.
Linn, B. F. July 3, 1891.	Payson, Geo. B. Feb. 28, 1894.
Lockwood, W. H. Oct. 26, 1891.	Payzant, Wm. A. Jan. 1, 1895.
Long, W. R. April 28, 1893.	Peabody, Francis Jan. 30, 1897.
Luther, T. G. Mar. 6, 1899.	Pengra, Chas. P. Jan. 31, 1892.
McAlpine, Volney Sept. 1, 1900.	Pepin, Pierre T. May 24, 1899.
McCall, Chas. W. June 7, 1900.	Perry, Bertram J. July 29, 1900.
McClosky, W. R. July 9, 1899.	Petermann, Adolf Feb. 5, 1891.
McCollum, Hugh June 20, 1900.	Pevey, Franklin M. May 1, 1900.
McElhaney, Geo. W. Sept. 15, 1893.	Pike, Ira E. July 21, 1900.

	DATE OF DEATH.
Pinney, Worthington ..	Feb. 22, 1894.
Plummer, J. W.	Aug. 5, 1897.
Pomeroy, W. B.	Aug. 28, 1899.
Porter, J. M.	May 7, 1899.
Poulson, Francis M.	May 18, 1899.
Poyer, U. G.	Jan. 2, 1895.
Preterre, M. A.	—, 1893.
Price, Edward G.	April 10, 1899.
Prince, Fred. A.	Feb. 6, 1900.
Quinlan, Chas. H.	Dec., 1897.
Rawls, A. O.	April 22, 1894.
Rawls, Wm. S.	Jan. 13, 1900.
Reed, W. T.	—, 1897.
Register, John E.	Nov. 8, 1892.
Rehfuss, Wm. F.	Mar. 28, 1893.
Reinhardt, F. A., Sr.	Nov. 2, 1892.
Reinohl, Harvey B.	June 20, 1893.
Runyan, Frank C.	—, 1891.
Renn, Geo. M.	Jan. 6, 1897.
Revell, J. M.	—, 1896.
Rhone, J. W.	May 15, 1894.
Richardson, W. E.	Dec. 5, 1897.
Richmond, Geo. P.	Aug. 3, 1898.
Richter, Chas. H.	May 3, 1900.
Riggs, J. L.	—, 1897.
Roberts, David	Sept. 30, 1891.
Roberts, Geo.	Dec. 14, 1892.
Robinson, A. H.	Oct. 11, 1898.
Robinson, J. A.	Mar. 3, 1897.
Robson, Thos.	Dec. 21, 1893.
Root, Julius S.	Sept. 14, 1900.
Royce, Wm. A.	April 27, 1899.
Runkle, D. W.	Jan. 21, 1892.
St. John, I. C.	June 3, 1899.
Salmon, Ira A.	April 10, 1896.
Salter, James A.	—, 1897.
Sampsell, —.	Mar. 15, 1892.
Sauer, Carl	Mar. 17, 1892.
Sawyer, Chas. K.	Dec. 20, 1893.
Sawyer, E. S.	April 26, 1899.
Swacke, Jos. W.	July 1, 1894.
Scruton, Chas. H.	Aug. 9, 1895.
Sedgwick, W. H., Sr.	Oct. 24, 1895.
Sheffield, W. W.	Nov., 1897.
Sheppard, Robt. A.	Jan. 19, 1895.
Shields, Lewis N.	Feb. 23, 1894.
Shingle, Thos. A.	June 11, 1899.
Sibley, L. W.	May 6, 1892.
Silliman, H. H.	Nov., 1892.
Skiff, Lansing F.	Mar. 8, 1899.
Slegel, Eli	Mar. 10, 1897.
Slocum, L. M., Sr.	—, 1892.
Slocum, L. M., Jr.	—, 1892.
Smith, C. Cutler.	July 9, 1896.
Smith, Clark	Dec. 14, 1899.
Smith, J. H.	Nov. 9, 1893.
Smith, John J.	Aug. 14, 1894.
Smith, J. Lewis.	—, 1897.
Smith, J. M.	April, 1899.
Smith, Wm. H.	June 23, 1897.
Snow, Gustavus N.	Jan. 27, 1892.
Snowden, Henry.	Jan. 16, 1894.
Southwell, C. P.	June 5, 1894.

	DATE OF DEATH.
Southwick, Alfred P.	June 11, 1898.
Spalding, C. W.	June 9, 1896.
Spangler, Geo. M.	Feb. 26, 1892.
Staples, H. G.	Dec. 13, 1891.
Starr, Ira	Oct. 11, 1893.
Stark, Jno. K.	Jan., 1895.
Stearns, G. O.	Dec. 2, 1895.
Stebbins, Edwin A.	Sept. 26, 1896.
Stetson, F. A.	—, 1895.
Stetson, Jno. T.	Mar. 12, 1900.
Stewart, Jas. M.	Feb. 1, 1892.
Stevens, E. W.	—, 1900.
Sticker, Harrison C.	Feb. 28, 1900.
Sticker, Lake E.	April 7, 1900.
Stockton, J. A.	Sept. 13, 1891.
Storey, John C.	Mar. 17, 1897.
Straw, Lendon S.	Oct. 9, 1899.
Streeter, R. M.	July 6, 1893.
Suggitt, Fred. R.	—, 1892.
Swasey, Jos. A.	—, 1892.
Swasey, Jas. A.	Dec. 24, 1896.
Taft, W. A.	July 21, 1897.
Taylor, Andrew H.	Feb. 28, 1900.
Taylor, James	—, 1896.
Tees, Ambler	April 11, 1891.
Tenison, Wm. D.	Mar. 11, 1900.
Thackston, W. W. H.	Dec. 8, 1899.
Tomes, Sir John.	July 29, 1895.
Tomlinson, S.	Feb. 11, 1891.
Townsend, H. H.	Feb. 5, 1895.
Tucker, Elisha G.	May 18, 1895.
Van Antwerp, Jas.	Aug. 5, 1892.
Vanderford, Julien J.	Jan. 5, 1891.
Van Valzah, Robt.	Oct. 23, 1892.
Van Vlick, Wm. B.	Jan. 14, 1898.
Varney, Lorenzo A.	April 28, 1894.
Verplanck, Robt. I.	Aug. 27, 1899.
Wade, John W.	June 4, 1894.
Wadsworth, E. C.	Dec. 22, 1895.
Wadsworth, Hiram N.	Oct. 9, 1896.
Wadsworth, Theo. A.	Mar. 18, 1899.
Wales, Arthur E.	Sept. 14, 1900.
Walker, Ransom	July 31, 1894.
Waller Bey, R. C.	—, 1897.
Walter, Lorenzo D.	Nov. 16, 1898.
Walton, T. O.	Dec. 21, 1900.
Ward, David P.	April 18, 1895.
Ward, Electus B.	April 25, 1891.
Ward, F. E.	May 14, 1894.
Wardlaw, W. C.	Sept. 3, 1893.
Wardle, Samuel	Jan. 24, 1894.
Waters, Wm. H.	Jan. 2, 1900.
Watt, George	Feb. 16, 1893.
Watts, Alfred J.	Jan. 22, 1900.
Waugaman, S. P.	July 20, 1900.
Weagant, Geo. H.	July 8, 1899.
Webber, Cushing	Sept. 3, 1895.
Weil, Ludwig A.	April 13, 1895.
Weiss, Felix	—, 1892.
Welch, Chas.	Sept. 9, 1900.
Wells, A. B.	Mar. 19, 1896.
Wells, Graham A.	June 24, 1894.
Wheaton, M.	April, 1898.

	DATE OF DEATH.		DATE OF DEATH.
Wheeler, T. B.	Jan. 9, 1894.	Wilson, E. F.	Sept. 17, 1900.
White, J. W.	May 27, 1891.	Wilson, F. D.	Jan. 1, 1899.
White, John DeH.	Dec. 25, 1895.	Winder, R. B.	July 18, 1894.
White, W. W.	April 6, 1894.	Wing, Stephen R.	May 16, 1891.
Whitten, D. Frank.	Mar. 8, 1891.	Winter, Washington G.	Dec. 24, 1892.
Wilbur, E. O.	July 24, 1891.	Witt, William.	Mar. 25, 1891.
Wilkerson, S. C.	Oct. 15, 1897.	Wood, J. S.	—, 1897.
Wilkie, C. M.	Nov., 1892.	Woodcock, Fred. H.	June 27, 1895.
Williams, Edw.	Dec. 11, 1893.	Woodley, Jos. R.	Sept. 29, 1897.
Williams, Frank W.	Dec. 18, 1894.	Woodside, J. B.	May 1, 1895.
Williams, Geo.	April 28, 1891.	Wortman, J. W.	May 11, 1900.
Williams, Geo. F.	Nov. 10, 1900.	Wright, C. F.	Dec. 15, 1895.
Williams, Henry L.	Feb. 2, 1892.	Wyllie, N. P.	Jan. 26, 1900.
Williams, Richard S.	April 15, 1896.		

NEW DENTAL COLLEGE AFFILIATION.

WE have received authoritative information that the Washington Dental College and Hospital of Oral Surgery has joined forces with Georgetown University, and will hereafter be known as the Dental Department of that institution.

BIBLIOGRAPHICAL.

POEMS OF THE FARM, AND OTHER POEMS. By CHARLES NELSON JOHNSON. Chicago, Daniels Company Press, 1901.

It is not surprising that a calling such as dentistry should attract to its ranks those of artistic temperament, and that this temperament should find expression not only in the routine applications of dental art, but in other ways as well.

It has not infrequently happened that dental practitioners have courted the poetic muse, and with varying degrees of success.

The little volume modestly put forth by Dr. Johnson is of a character which appeals at once to the heart of the reader because of its simplicity, and because of the sympathetic spirit in which it treats of those homely topics and sentiments connected with farm life which have formed the inspirational background to the lives of some of our most eminent men in their later years.

The whole book brings with it that touch of nature upon which the kinship of humanity is said to be based, and one cannot rise from the reading of these simple poems without feeling better from their perusal.

It is not easy to define what constitutes good poetry, but it is surely not bad poetry that exalts and stimulates higher human sentiment and thus fulfills an important and useful office, however it may be regarded by the artistic critic from the point of view of classic poetical standards.

IGIENE DELLA BOCCA E DEI DENTI. Nozioni elementari di Odontologia del Dott. LUDOVICO COULLIAUX.

HYGIENE OF THE MOUTH AND TEETH. An Elementary Treatise on Odontology. By Dr. LUDOVICO COULLIAUX, Royal University of Parma. Milan, published by Ulrico Hoepli. 1901.

The author begins by discussing the importance of preserving the mouth in a healthy condition, for, as he very wisely says, good health and bad teeth are incompatible.

The book can be divided into three parts. In the first part he treats of the anatomy and physiology of the mouth; in the second he discusses the abnormalities and diseases related to the deciduous and permanent dentitions, while the third he devotes to the hygiene of the mouth.

The author's exposition of the subject is very explicit. He has accomplished much in a limited number of pages, and we feel sure that the medical and dental professions of Italy will appreciate his efforts.

MICROBIOLOGIA DEL Dott. LUCIANO PIZZINI, Bergamo.

MICROBIOLOGY. By Dr. LUCIANO PIZZINI, Bergamo, Italy. Milan, published by Ulrico Hoepli. 1901.

This treatise on microbiology, from the pen of Dr. Pizzini, the eminent Italian bacteriologist, is a worthy addition to medical literature. The author treats in the clearest manner the different aspects of this topic.

This little work is divided into nine chapters. In the first three he discusses bacteriology proper, in the next two the different methods of sterilization and disinfection, and in the remaining four he gives an *exposé* of the active causes of the many infectious diseases.

Considering the important rôle of microbiology and the high scientific attainments of the author, we have not the slightest doubt that the work will find an appreciative audience.

DENTAL ELECTRICITY. By LEAVITT E. CUSTER, B.S., D.D.S., Lecturer on Dental Electricity in Ohio College of Dental Surgery, etc. Dayton, Ohio, U. B. Publishing House. 1901.

The manifold uses to which electrical energy is now successfully and practically put, and the many appliances concerned in its generation, storage, transmission, and utilization, together with the research and the development of our knowledge of the subject, has created an amount of detail beyond the comprehension of any single

mind. The applications of electricity to dental use have correspondingly developed until a staggering array of important data confront the student and practitioner in the endeavor to make intelligent use of it in his daily practice. A trustworthy guide has long been needed to place within the grasp of the ordinary student the essential principles of the subject of electricity in its dental relations.

In this work, of about five hundred and thirty pages, Dr. Custer has squarely met a definite want. The story is told in clear and simple style, which deals only with what the practical man wants to know about the subject. The book throughout bears the impress of the author's experience, and fine-spun theories are studiously avoided. It is true that as a pioneer the work has no competitors with which it may be critically compared, but, as fulfilling its object, it has established a standard of excellence which its successors will have to do well to exceed in merit. The work should form the basis of instruction on this subject in all dental schools, and it must necessarily serve as a handbook for all practitioners who desire to acquire a competent knowledge of dental electricity.

OBITUARY.

DR. W. H. MORGAN.

DIED, May 16, 1901, at his home in Nashville, Tenn., of exhaustion following gastritis, WM. HENRY MORGAN, D.D.S., in the eighty-fourth year of his age.

Dr. Morgan was born in Logan county, Ky., February 22, 1818, his parents being Joseph and Elizabeth Morgan. His father was a soldier in the war of 1812, fighting under Jackson in the battle of New Orleans. His grandfather was a colonel in the Revolutionary War, and was first cousin to Gen. Daniel Morgan, of the Continental Army.

Losing his mother when he was only six years of age, Dr. Morgan's early education was neglected, but that thirst for knowledge so frequently found in those whose opportunities are limited, developed in the boy as the years passed on, and when he was able to earn money for himself, it was usually spent for books, and books being high in price, and bought at the cost of self-sacrifice, they were certain to be well selected and thoroughly studied. Thus he developed a taste for reading and a habit of thinking which laid the foundations for his lifelong enthusiasm in the acquisition of knowledge.

After a season of pupilage in dentistry with a Dr. Simpson, in Kentucky, he entered the Baltimore College of Dental Surgery, from which he was graduated in March, 1848. After leaving college, he commenced practice in Russellville, Ky., but in 1849 went to Nashville, and entered into partnership with Dr. T. B. Hamlin, who was at that time the only other dentist in Tennessee who had graduated from a dental college. This partnership continued for ten years.

Dr. Morgan was elected a member of the Board of Trustees of the Ohio Dental College in 1865, and was later elected president of the college, which position he resigned in 1879 to accept the chair of clinical dentistry in Vanderbilt University. He organized the Dental Department of the university, and held the position of dean of that department until his advanced age compelled him to give up the work, discharging all the duties with an ability and a fidelity that were nothing less than admirable. During all this time he was also a trustee in the Meharry Medical College for colored youth, and took a great interest in the work of that institution.

In point of age and experience, Dr. Morgan was one of the oldest dentists in the South at the time of his death. His interest in dental associations was very active. He became a member of the American Dental Association in 1865, and in 1870 was elected its president. He also filled the office of president in the Central States, Mississippi Valley, Tennessee, and Nashville Associations. His contributions to dental literature were frequent and important, and his labors have been a great factor in the elevation of his profession.

As a citizen, Dr. Morgan occupied a very prominent position. From his youth up he was keenly alive to political issues. In the old days he was an intense Whig, and a worshipper of Henry Clay. Deprecating secession as a rash and foolish measure, he, nevertheless, when the war came sympathized with the people of his own section. After the close of hostilities and the end of the reconstruction period he found himself without a party, and showed his characteristic independence by voting his convictions in every case, without much regard to political affiliations; and for the criticisms to which this course subjected him he cared nothing. In 1885 he was appointed to the Indian Commission by President Cleveland and served during a portion of Harrison's administration, when he retired on account of advancing age.

While still a young man, Dr. Morgan connected himself with the Methodist Church on profession of faith, and remained an unwavering believer through all his subsequent years. Everybody in the community knew where he stood on moral and religious issues, and no one ever called his sincerity into question. Active in religious duties, as in all else, he held nearly every office in the church for which a layman is eligible, and for many years was superintendent of the Sunday-school of the McKendree Methodist Episcopal Church, and for a still longer time taught a Bible-class, made up largely of university students.

His various outside interests, duties, and activities did not interfere with the completeness of his home life. Married November 30, 1852, to Miss Sarah A. Noel, of Kentucky, he was the father of four children, all of whom survive him. They are Mrs. C. H. Noyes, of Warren, Pa.; Dr. Henry W. Morgan and Messrs. Jo B. Morgan and Garnet B. Morgan, of Nashville. His children as they grew up acquired naturally from the precept and example of their loving father the lessons of self-respect, of reverence for the church and devotion to God, which controlled and beautified his own life. As a result they are all pronounced Christians and ardent Methodists, who, while they keenly feel their loss, are cheered by the recollection of his true and stainless life, and by the sure hope of reunion which the Gospel inspires.

Since the death of his wife, which took place about five years ago, Dr. Morgan has been gradually loosening his hold on the affairs of this life, and adjusting himself to the thought of the great change. It could not have

been a surprise to him when the summons came. Surrounded by his children and grandchildren, he made a good end of a noble life.

Dr. Morgan was a prominent Mason, a member of the Scottish Rite, and had been for many years prelate of the Nashville Commandery of Knights Templar.

DR. CHARLES H. McDONALD.

DIED, December 9, 1900, at his home in Brooklyn, N. Y., from typhoid fever, CHARLES H. McDONALD, D.D.S.

Dr. McDonald was born in Worcester, Mass., where he resided until he took up the study of dentistry in the Philadelphia Dental College, having been graduated from that institution in 1895. After graduation he entered upon practice, and later became connected with the Cady Dental Company, of Troy, N. Y. About eighteen months ago he accepted a position in Brooklyn. During the latter part of November, 1900, he contracted typhoid fever which terminated fatally, as stated.

He was buried from the home of his mother, Worcester, Mass., December 12th. A solemn requiem high mass was celebrated in St. John's Church by the Rev. C. A. Sullivan, who also performed the last rites at the grave, in St. John's Cemetery. The bearers were all professional friends. A large number of beautiful floral tributes were sent by friends of the deceased.

(We are indebted to the *Stomatologist*, April, 1901, for the foregoing account.)

DR. W. S. READ.

DIED, at his residence, in San Diego, Cal., February 16, 1901, after a long and painful illness, Dr. W. S. READ, in his sixty-second year.

Dr. Read was born in Gananoque, Canada, June 16, 1839, and settled in California forty years ago.

While he had been in feeble health for years, his indomitable will and characteristic cheer so concealed his physical suffering that but few realized how great it was or that the end was so near.

He was one of the oldest dentists in the state, having practiced his profession for more than thirty years. He was a close student, skillful, conscientious, progressive, and unselfish in his devotion to his profession. He was amiable, gentle, patient, kind-spirited, giving freely the kind word and helping hand, with broad charity to his fellow-man, and was a fearless advocate of what he believed to be right.

In later years, much of his time was spent in his room and in bed, but he maintained a practical interest in the profession to which he gave his life as well as in all that related to the progress and prosperity of the city. During these years of protracted illness he has been tenderly cared for by a most devoted and affectionate wife, Dr. Emma T. Read, who has practiced dentistry in San Diego for fifteen years.

Dr. Read was a member of the Presbyterian Church, and his faith in divine wisdom and love was unwavering. The sound sense, the honest and kindly nature of the man, with a reputation so stainless, endeared him to the community in which he lived.

DR. BENJAMIN P. MERRILL.

DIED, at Plymouth, N. H., March 9, 1901, of rheumatism and kidney disease, B. P. MERRILL, D.D.S., aged eighty-one years.

Born in Rumney, N. H., in 1819, it was not until middle age approached that Benjamin P. Merrill entered upon the study of dentistry, after a pupilage of two years in the office of Dr. Wood. In 1860 he began practice for himself in Plymouth, in which he continued until old age caused his retirement, except for a period during which he attended the Boston Dental College, from which he was graduated in 1872. He was a member of the New Hampshire State Dental Society. In 1844 he married Miss M. T. Johnson, of Wentworth, N. H., who survives him.

JACOB ZOLLINGER HOFFER, D.D.S.

DIED, at his home in Columbia, Pa., March 22, 1901, of valvular heart trouble, Dr. JACOB Z. HOFFER, in his seventy-fifth year.

Dr. Hoffer was born at Carlisle, Pa., April 7, 1826. He entered upon the study of dentistry in 1855, in the office of Dr. G. W. Neidich, of Carlisle. In 1858 he settled in Columbia and began the independent practice of his profession. He graduated at the Baltimore Dental College in 1869. Death came to Dr. Hoffer suddenly; after breakfasting as usual with his family he went to his laboratory to finish a case he had in hand. Some time afterward his wife entered the room and found him seated on a chair with his head leaning against the wall. A physician was summoned, who announced that he had been dead when first discovered.

Dr. Hoffer, as a young man, enlisted in the Mexican War, and served through the whole campaign, receiving an honorable discharge. In 1861 he married Sarah J. Grove, who, with five children, survives him.

RESOLUTIONS OF REGRET.

DR. HENRY J. B. MCKELLOPS.

THE following resolutions were adopted by the Mississippi Valley Association of Dental Surgery, the oldest dental society in the world, of which Dr. McKellops was a faithful and earnest member:

WHEREAS, In the providence of the great Creator of the universe He has been pleased to remove from earth's trials and sorrows our beloved friend and co-laborer, Dr. H. J. McKellops, who for many long years has been a devoted worker in the interest of his profession and for the benefit of mankind: He was a constant attendant at the different associations of the profession, especially at the meeting of the Mississippi Valley Association, where his generous features beamed with delight and enthusiasm as he met his friends of years ago. He always brought with him to these meetings something of interest, either in mode of procedure or some valuable appliance, and always took part in the deliberation of its members. He was always free in his manners, having no secrets to himself, and liberally assisting those who came to him for aid. In his demise the profession has been deprived of a devoted laborer in the vineyard, and one who never shirked a duty assigned him; therefore, be it

Resolved, That we cherish in memory the many virtues of our friend,

feeling that our loss is his gain, and we may never meet his like on earth again. May his example cheer and inspire us along the pathway of life till the dark future lets its curtain down, and we are swallowed up by eternity.

Resolved, That although he is forever gone from us we may benefit by what he has done, in his love for the profession, and his sincere attachment to his friends.

Resolved, That we commend his spirit to Him who gave it, and that we may in the future commune with it, freed from the dross of life, and purified by the troubles through which it has passed.

Resolved, That the secretary be instructed to extend our sincerest sympathy and condolence to the family in this their great bereavement, and that a copy of these resolutions be sent to them, and to the editors of the different dental journals of the country.

E. G. BETTY,

J. TAFT,

WM. TAFT,

D. W. CLANCY,

H. A. SMITH,

H. T. SMITH,

C. M. WRIGHT,

R. J. PORRE.

DR. THEODORE F. CHUPEIN.

At a regular meeting of the Pennsylvania Association of Dental Surgeons held Tuesday evening, April 9, 1901, the Committee on Resolutions upon the Death of Dr. Theodore F. Chupein submitted the following, which were adopted:

WHEREAS, With profound regret the Pennsylvania Association of Dental Surgeons is called upon to notice the death of Dr. Theodore F. Chupein, an old, tried, and faithful member, it is meet and fitting that it should place on record its appreciation of his long and faithful services as a member, and of his far-reaching, earnest, and valued services to the profession he loved.

Dr. Chupein became a member of the association September 13, 1876, and at once, with earnestness, took and has continued to take with unflagging zeal an active part in all its work. He was elected recording secretary October 9, 1877, and by re-election continued to serve until his death March 23, 1901.

His earnestness in professional work, his faithfulness as a member and officer of this association, his manliness and his friendliness well merit our most profound appreciation and respect; be it therefore

Resolved, That by the death of Dr. Theodore F. Chupein the dental profession has lost an earnest and progressive member, and this society a firm and fast friend.

Resolved, That bowing in humble submission to the will of Him who doeth all things well, we hereby express our heartfelt sympathy to his bereaved wife and family; and be it further

Resolved, That a copy of these resolutions be transmitted to his family, and published in the dental journals.

WILBUR F. LITCH,

WM. H. TRUEMAN, *Committee*.

J. CLARENCE SALVAS, *Sec'y*.

DR. TH. E. LECAUDEY.

THE following resolutions of regret on the death of Dr. Lecaudey were adopted by the American Dental Society of Europe:

WHEREAS, We, the members of the American Dental Society of Europe have heard with deep regret of the death of our distinguished colleague Dr. Theodore Emmanuel Lecaudey; therefore, be it

Resolved, That by this sad event our profession has lost one of its most revered members, whose fame belonged not only to his own country, but which was also the prized possession of the civilized world.

Resolved, That we offer to his afflicted family the assurances of our respectful sympathy.

W. E. ROYCE,
N. S. JENKINS.
W. R. PATTON.

DR. ZENAS V. CARVILL.

DIED, April 12, 1901, at his home, Fall River, Mass., Dr. ZENAS V. CARVILL, in his forty-third year.

Dr. Carvill was born in Franklin county, Maine, February 16, 1859. From early youth he showed remarkable ability and business aptitude, and he engaged in several business enterprises prior to his study of dentistry. In 1878 he became a student in the office of Dr. B. M. Hardy, of Farmington, Me., and in 1881 entered into practice for himself in Phillips, Me. While a resident of Phillips he was active in municipal, educational, and business matters, was superintendent of the public schools, and founded the Phillips Savings Bank, of which he was for some years president and treasurer.

In 1887 he moved to Fall River, Mass., and associated himself with Dr. William E. Williams, in his dental practice. The partnership was dissolved a few years ago, and Dr. Carvill conducted the business alone until his death. Active in society business, he was a member of the Fall River Dental Association and the Massachusetts Dental Society, also a member of Masonic organizations and of the Odd Fellows.

He leaves a family of three children—two daughters and a son.

PERISCOPE.

FORMOL AND ITS DERIVATIVES, WITH THEIR USE IN DENTISTRY.—Formol (H.CO.H),—also called formic aldehyd, formaldehyd, formalin, and methanal,—occupies a very important place in general therapeutics and a more important one yet in dental therapeutics. This agent owes this important distinction to its powerful antiseptic action with its slight toxic properties. Chemistry has given us a great many derivatives of formol; these, with the exception of trioxymethylene, have not been used for therapeutic purposes, at least not in dentistry. As has been demonstrated with other compounds, those here under consideration possess both the properties of the original drug and those of the agents with which it is combined.

Pharmaceutical Preparations of Formol.

Formols are of two varieties: A. The so-called *geranium formols* (as described below). B. The *formogenic powders*. The works of Marion and André speak of the usefulness of these agents in the treatment of caries of the third and fourth degree.

A. *Geranium Formols*.—The formula for the preparation of a *strong* solution of geranium formol (40 per cent.), is the following:

Formol 40 per cent. solution, 40 c.c.;
Essence of geranium and roses, 20 c.c.;
Absolute alcohol, 40 c.c.

The essence of geranium and roses is dissolved in 35 c.c. of alcohol, the formol is added, and the whole is strongly shaken; then enough absolute alcohol to make 100 c.c. is added. This formula is not very stable; it allows the separation of some essence of geranium which the alcohol has not dissolved. To make the solution clearer it may be filtered through a little magnesium carbonate, which retains the excess of geranium,

Formula for *weak* geranium formol:

Formol at 40 per cent., 10 c.c.;
Essence of geranium at 20 per cent., 10 c.c.;
Absolute alcohol, q. s. ad 100 c.c.

The preparation is made in the same way as in the preceding case. No geranium escapes from this solution.

B. *Formogenic Powders*.—Formula for powdered formol (formorin-formoform):

Formaldehyd at 40 per cent., 0.13 gm.;
Thymol, 0.10 gm.;
Zinc oxid, 34.44 gm.;
Starch, 65.27 gm.

The thymol is finely powdered, it is mixed with the zinc oxid, then with the starch, and lastly with the formaldehyd. A paste is made of this powder by means of oil of cinnamon or of cloves. This powder equals the best known preparation of formogen.

Iodized formol:

Formaldehyd at 40 per cent., 2 to 3 drops;
Iodin, 2.50 gm.;
Thymol, 1.25 gm.;
Zinc oxid, 34.25 gm.;
Starch, 60 gm.

The iodine and the thymol are first triturated, then the zinc oxid, starch, and formaldehyd are successively incorporated. This powder is more caustic than the preceding one.

The above are the formulas of Dr. Aufrocht, of Berlin.

Derivatives of Formol.

1. *Amyloform*. Combination of formic aldehyd and starch. An odorless, insoluble white powder. Antiseptic.

2. *Creosoform*. Creosoform of Brissonnet is a product of condensation of formic aldehyd and creosote. One hundred parts of beechwood creosote are mixed with 80 parts of a 40 per cent. solution of formaldehyd and 150 parts of hydrochloric acid. After heating the mixture, a substance (creosoform) is produced, which solidifies by cooling. It is a greenish, odorless and tasteless powder, insoluble in water and glycerin, but slightly soluble by means of heat in neutral solvents, such as alcohol and ether. It is soluble in potassium and sodium solutions. If instead of using beechwood creosote the coal-tar product be employed, the resulting preparation will differ widely. It will be a slightly pinkish powder with a phenol odor, which is not disagreeable; it has a caustic taste, is insoluble, and possesses all the other properties of creosoform prepared with beechwood creosote. The creosoforms are not toxic. In contact with living cells creosoform gradually undergoes decomposition into creosote, with its caustic action, and nascent formol, with its antiseptic properties. It is recommended that creosoform be tried in the form of caustic and antiseptic powder or else in the form of a dental paste in combination with any antiseptic oil.

3. *Dextroform*. A combination of dextrin and formol. It is a white powder, nearly odorless, very soluble in water or glycerin, which is an advantage over amyloform, and is insoluble in absolute alcohol, ether, or chloroform. Under heat its color gradually changes to yellow and brown, when it melts, and is decomposed into formic and acetic acids. The very great solubility of this substance and its non-toxic properties enable us to make saturated sterilized solutions capable of bringing about thorough antiseptics of pulp-canals.

4. *Eugenoform*. Eugenol possesses properties well known in dentistry, and this would lead us to suppose that association with formol might increase its medical value.

5. *Formaldehyd-casein*. This compound was discovered by Merck, who obtains it by the condensation of the two constituents. It is a yellowish, odorless, tasteless powder, soluble in diluted acids and insoluble in alcohol. It is slightly antiseptic, and is employed in surgery for the preparation of dressings, especially cotton and gauze.

6. *Formaldehyd-gelatin, or glutol.* Glutol is prepared by dissolving 500 gm. of gelatin in a sufficient quantity of water, adding twenty-five drops of pure formic aldehyd, and drying the product obtained in an atmosphere charged with vapors of formic aldehyd. Schleich has shown the antiseptic properties of this preparation in connection with the treatment of wounds; in contact with living cells it decomposes gradually, releasing vapors of formol, which, on account of their being in the nascent state, produce a complete asepsis of the wound. When applied directly on wounds, it arrests suppuration and hastens the healing process.

7. *Dimentholic formol.* From a chemical point of view, the dimentholic formol of A. Brochet shows the possibilities of combining the formic aldehyd with the alcohols of the aromatic series on the same lines as the combination of this aldehyd with the alcohols of the fatty series. It is a solid and white body with a special and somewhat disagreeable odor different from that of menthol. It is insoluble in water, but very soluble in ether and benzin; it is slightly soluble in cold alcohol, but very soluble in warm alcohol, which crystallizes it in the form of silky, delicate needles. It fuses at 56.5° C., while menthol fuses at 36.5° C. This compound should prove very valuable in cases of hypersensitive dentin if besides the anesthetic properties of menthol it also possess the characteristics of formaldehyd.

8. *Diborneolic formol.* This compound presents great analogy in its constitution to dimentholic formol. It crystallizes in lamellæ of nacreous appearance. It has an odor exactly like that of camphor, possibly on account of traces of camphor remaining in the final product, although many purifications do not modify the odor to any appreciable extent.

It is very soluble in alcohol and benzin and fuses at 166° C.

9. *Steriform.* This is an insoluble, insipid, almost odorless powder containing apparently lactose and 5 per cent. of formic aldehyd. Praised as being a strong antiseptic.

10. *Tannoform.* The tannoform of Merck is a product of the condensation of gallo-tannin and formaldehyd. It is a light, reddish-white powder, insoluble in water and in the ordinarily used organic solvents except alcohol. In medicine it has been prescribed pure or combined with inert substances in the treatment of ozena, pruritus, and of hyperhidrosis in all its forms. This agent, of reliable action, could be made use of for the preparation of a geranium tannoform similar to the geranium formol; it possibly might do away with the accidents attributed to the caustic property of formol. It might also be tried in connection with tooth-powders and pastes.

11. *Thymoform.* As its name indicates, this agent is the product of the action of formaldehyd upon thymol. It comes in the form of a yellow powder having a faint odor of thymol. Thymoform is insoluble in water, soluble in alcohol, ether, chloroform, and in the fixed and volatile oils. It is a good substitute for iodoform in all its applications, especially in Witzel's paste.

12. *Trioxymethylene (paraform, triformol).* Paraform is polymeric to formaldehyd. It is obtained by heating an aqueous solution of formaldehyd. It comes in the form of a white crystalline powder, insoluble in water. Dr. Aronson claims for it strong antiseptic properties. Its bactericidal action is superior to that of beta-naphthol, salol, dermatol, benzonaphthol; beta-naphthol is the only agent that could be at all compared to it as far as antiseptic properties are concerned. Its action in a solution of 1:5000 upon the typhoid bacillus is as active as that of beta-naphthol in solution of 1:3000; moreover, 0.05 gm. of paraform sterilizes a liquid just as well as 0.15 gm. beta-naphthol. It is not toxic; the ingestion of 5 gm. in a single dose only acts as a good purgative. Dr. Miquel has recommended the vapors of trioxymethylene for the disinfection of apartments. He recommends the following paste: Crystallized paraform and calcium chlorid equal parts. This paste is made with water and is spread over paper strips which are suspended in the room to be disinfected. It is used in medicine for the treatment of wounds. It is only very recently that this valuable agent has been used in dentistry. Pitsch has used it for the capping of the pulp when this organ is in a healthy condition and for the filling of pulp-canals. In caries of the fourth degree, after the ordinary antiseptic treatment, he uses it for filling pulp-canals. This author recommends the following paste:

Trioxymethylene, 16 gm.;
Pure vaseline, 8 gm.;
Inert powder, 6 gm.;
Cocain hydrochlorid, 2 gm.

Dr. Robin fills the pulp-canals with the following paste:

Trioxymethylene, 1 gm.;
Zinc oxid, 9 gm.

It is claimed that trioxymethylene prevents the putrefaction of dead organic substances.

It can be seen from the above description that the study of the application of the derivatives of formol would enrich dental therapeutics.—A. ANDRÉ, *Pharmacist to the Lyons Hospitals, in l'Odontologie*.

DENTAL SCHOOL OF RIO DE JANEIRO.—The Dental School of Rio de Janeiro, which held its opening exercises in that city February 9, 1901, is not an officially recognized institution, for, according to the laws which regulate establishment of higher education in Brazil, an institution belonging to this class cannot be officially recognized before it has had two years of existence; it must also have a capital of about ten thousand dollars and a list of sixty matriculates. Dr. Aristide Benicio de Sa, director of the school, and eight other prominent dentists compose the faculty.—*l'Odontologie*.

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

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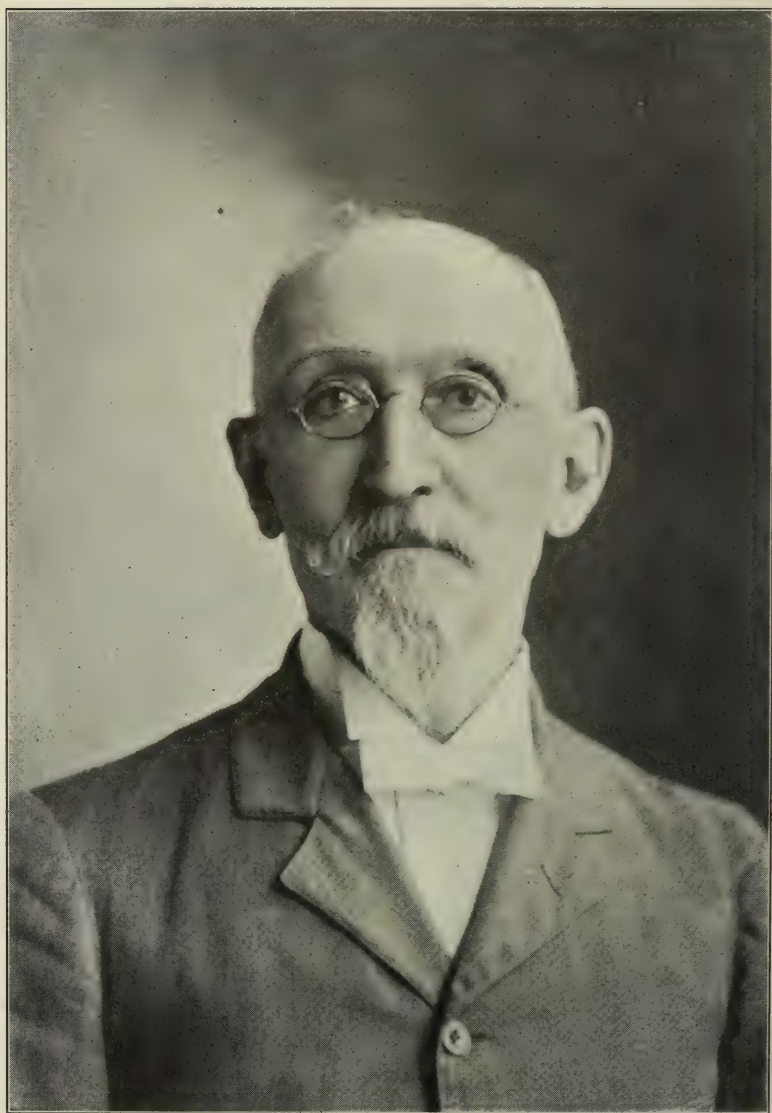
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LIST OF UNITED STATES PATENTS PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING MAY, 1901.

- May 7.—No. 673,802, to DANIEL P. TANCO. Dentistry.
 " 14.—No. 674,232, to BENJ. B. BREWER and WM. M. H. BURFEIND. Apparatus for swaging gold crowns.
 " 21.—No. 674,419, to CHARLES T. KINSMAN. Root-canal filling for teeth.
 " " —No. 674,423, to GUIDO E. LOB. Mechanical speed regulator.
 " " —No. 674,449, to JAMES B. MORGAN. Dental bridge-work.
 " " —No. 674,499, to LEWIS EATON, JR. Tooth-brush case.
 " " —No. 674,565, to FRANK RITTER. Head-rest for chairs.
 " " —No. 674,581, to NORRIS C. LEONARD. Means for swaging metal dental plates.
 " " —No. 674,650, to A. W. LUNDBORG. Dental tongue-holder and drain-tube.
 " " —No. 674,761, to PHILIP J. FRIEDRICH. Dental tool for filling teeth with amalgam.
 " " —No. 674,834, to BENJAMIN B. BREWER and WM. M. H. BURFEIND. Process of swaging dental crowns.
 " 28.—No. 674,965, to JOHN C. GRAFT. Dental tool.
 " " —No. 675,044, to HENRY D. JUSTI. Mounting artificial teeth for exhibition.
 " " —No. 675,183, to WILLIS E. ALLEN. Dental tool.
 " " —No. 675,293, to OSCAR H. PIEPER and ALPHONSE F. PIEPER. Controller for electric motors.
 " " —No. 675,294, to OSCAR H. PIEPER and ALPHONSE F. PIEPER. Electrical controlling apparatus.



Geo. L. Ledy

THE
DENTAL COSMOS.

VOL. XLIII.

PHILADELPHIA, AUGUST, 1901.

No. 8.

ORIGINAL COMMUNICATIONS.

A STUDY OF SOME DENTAL ANOMALIES WITH REFERENCE
TO EBURNITIS.

BY W. D. MILLER, D.D.S., M.D., BERLIN, GERMANY.

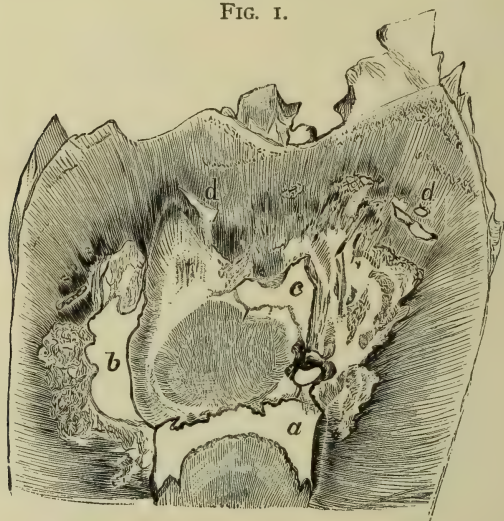
MANY cases of dental anomalies have been brought to the notice of the readers of dental journals within the past few years, and it might appear that nothing new could be learned from the presentation of further cases; yet there are a few specimens in my collection which appear to me to present peculiarities which have been seldom, or not at all, dealt with before, and for this reason to be deserving of publication.

The first case that I wish to describe is one which believers in the possibility of inflammatory processes taking place within the hard tissues of the tooth (eburnitis, etc.) would pronounce to be a case of internal caries, or inflammation and suppuration of the dentin, leading to the formation of an abscess cavity in the midst of the hard tissue. Externally, the tooth appeared perfectly normal, and showed no signs whatever of the process which had taken place within; but on being split open it revealed an irregular black cavity about the size of a pinhead in the solid dentin, and having no connection whatever with the external surface; nor could any connection with the pulp-chamber be found which was passable to the finest wire or bristle. On grinding down the tooth, very many cavities were successively brought to view; some visible only with the aid of a magnifying glass, some about the size of a pinhead. The section itself (Fig. 1) shows, besides the pulp-chamber, two larger cavities, and seven minute ones are brought to light under a magnifying power of about ten diameters. Fig. 1, reproduced from a photograph under eight diameters, reveals the history of the case at a glance. An extensive absorption of the walls of the pulp-chamber has taken place through the agency

of the pulp, reducing the whole crown of the tooth to a mere shell and penetrating the walls in all directions. Subsequently a redeposition took place, consisting of tubulo-vaso- and osteo-dentin in varying proportions, imperfectly restoring the tissue lost by absorption.

During this process various-sized small portions of pulp-tissue were cut off from the body of the pulp (encapsuled), with which they became practically dead matter, and all further deposition of ossific matter ceased. In the dried tooth we accordingly find corresponding cavities filled with the blackish remains of such encapsuled or strangulated portions of pulp-tissue. This process is very familiar to any one who has made a study of pathological processes

FIG. 1.



Resorption of the walls of the pulp-chamber and redeposition of calcific matter. *a*, pulp-chamber; *b*, *c*, *d*, cavities in the dentin. (Magn. 8 diam.)

in the tusks of elephants. In fact, cavities of this kind may be repeatedly found in the heart of the elephant's tusk under comparatively normal conditions, as well as in teeth where osteo-dentin is normally formed (*e.g.*, walrus).

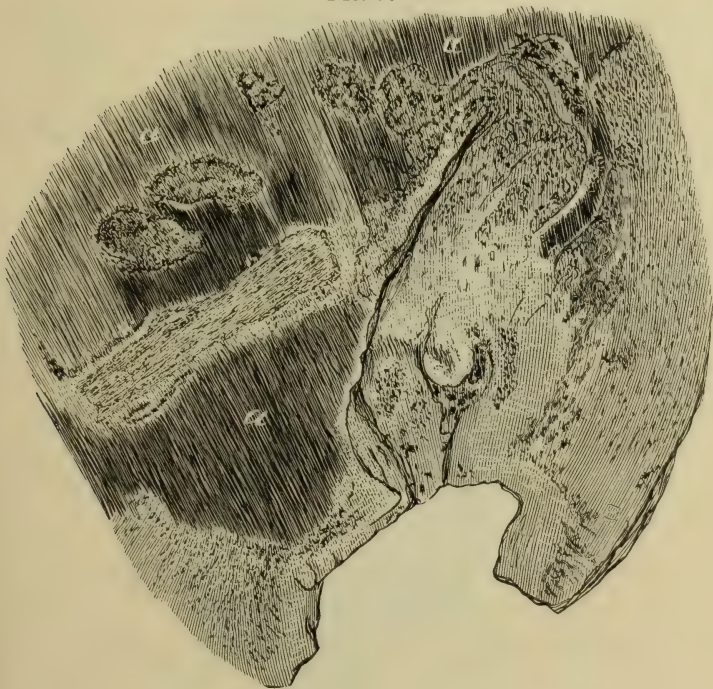
In the present case all of the smaller cavities comprised in the plane of the section were completely cut off from the pulp, while the cavity *c* which we first noticed in the solid dentin, as well as the cavity *b* which came to light during grinding, still have a very narrow communication with the pulp. It required only that the two opposing walls should coalesce in order to completely encapsule these cavities also.

In Fig. 2 a small portion of Fig. 1 is shown under a power of about seventy diameters. At *a* we see the primary (normal) dentin, the rest of the tissue consisting of the ossific matter with which the territories produced by absorption have been refilled.

Cases in practice have been reported in which extensive resorption has occurred through the medium of the pulp, and I distinctly

remember a case shown me by Dr. Kirk in 1890 in which the pulp of an upper right central incisor had worked its way by absorption through the labial wall of the tooth until it had appeared immediately beneath the surface as a bright red spot, the thin wall

FIG. 2.



Portion of Fig. 1 under 70 diameters.

of the enamel threatening to break through at any moment.* The only hope in such cases is in a redeposition of hard tissue, such as has taken place in the above specimen.

A second case, represented by a fragment of the crown of a molar, is shown in Fig. 3. Here no connection whatever could be

FIG. 3.



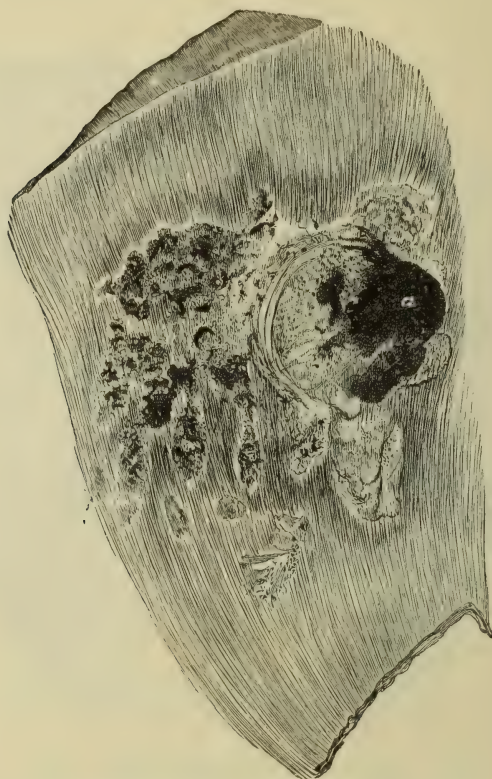
Fragment of molar with cavity (not caries) in the dentin.

traced with the pulp-chamber, the cavity having become completely encapsuled. At the time of its discovery the walls were coated with a reddish-black mass, apparently remains of pulp-tissue diffused with blood. A section of this tooth ground as thin as consistent

*[The case referred to was reported by Dr. J. H. Gaskill at the thirty-fourth annual meeting of the American Dental Association. See DENTAL COSMOS, vol. xxxvi, 1894, p. 1019.—ED.]

with the great danger of breaking, and stained with thionin, presented the appearance seen in Fig. 4. At *a* we have the cavity

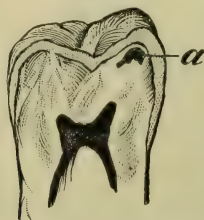
FIG. 4.



The cavity in Fig. 3 under 50 diameters.

shown in Fig. 3 surrounded by extensive absorption territories, which, as in the former case, have been filled out by a redeposition of calcific matter similar to that described in connection with Fig. 1,

FIG. 5.



Longitudinal section of crown of molar showing cavity (not caries) in the dentin.
(Magn. 2 diam.)

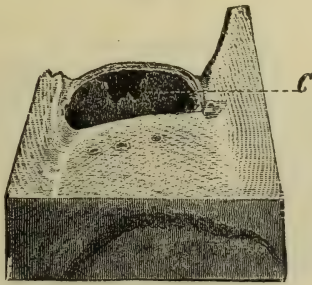
but showing in this case less structure, and consisting chiefly of bone-like matter. In Fig. 5 a third cavity of this kind is shown.

Cavities of this character, which we may call interstitial cavities, in contradistinction to cavities produced by caries, may result either from a suppuration of the pulp, ending in the destruction of a certain amount of pulp-tissue; or they may result from absorption, as has just been seen and illustrated in Figs. 1 to 5, or from both combined.

Processes of the first kind, in which cavities result from suppuration of the pulp, are very frequently met with in their results in the tusk of the elephant, and are fully dealt with by me in a series of articles in the *DENTAL COSMOS*, 1890-1891.

The tusks of the elephant are often subjected to extreme violence from without, and we have no difficulty in finding at any ivory-turner's specimens showing the results very plainly in form of cavities of various sizes and shapes in the solid tissue of the tusk. A pathological process (inflammation, suppuration, etc.) is set up, involving a portion of the pulp, depending upon the nature or severity of the insult. We accordingly find the disturbance in one

FIG. 6.



Abscess-cavity in piece of ivory. The primitive stratum is complete, and the abscess cavity (*c*) thereby separated from the pulp-chamber.

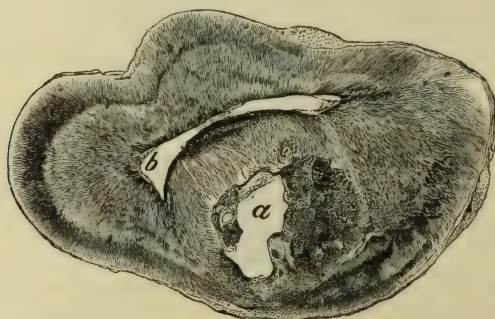
case extending over a complete segment of the pulp, and in another limited to a mere point. Naturally, all intermediate conditions may be met with. We can readily imagine that a slight inflammatory process may pass over and an almost complete *restitutio ad integrum* take place, so that we find in the ivory nothing but a slight irregularity in structure as testimony to the disturbance which the pulp had undergone in times past. In other cases the inflammation is of a very severe nature, leading to more or less extensive suppuration. In all these severer cases the pulp makes an effort to protect itself by isolating the diseased portion; at first throwing up a wall of very irregular matter, to be succeeded by more and more regular ivory. Fig. 6, reproduced from the article referred to, shows a case in which the pulp has in this way interposed a wall between itself and the diseased tissue, thereby isolating the cavity *c*. (For other cases, see article referred to.) As soon as this wall is complete, the pulp-tissue thereby isolated virtually becomes dead matter, and, in case micro-organisms are present, decomposes, so that when the cavity is cut into, an exceedingly offensive odor will be emitted.

In all the thousands of human teeth which I have examined dur-

ing the many years of my studies, I have met with only one case which bears a certain resemblance to the repairing process just described. This case I have reproduced, after a photograph, in Fig. 7. In this figure we have a cross-section through the neck of a somewhat deformed wisdom-tooth, showing a cavity at *a*, which has been bridged over and separated from the pulp-chamber *b*. The cavity presents the greatest similarity, both macroscopically and microscopically, to abscess cavities in ivory, and may have been caused by some severe local disturbance in the pulp at an early period in the development of the tooth. There are no indications of any process of absorption, such as seen in Figs. 1-5 and 15.

A case in which an abscess of the horn of an upper first molar, extracted for regulating purposes from the mouth of a healthy girl of twelve years, had undergone an isolating process, the pulp shutting it off by first throwing up a wall of secondary dentin, followed by regular dentin, was reported by Gysi in the *Schweizerische Vierteljahrsschrift für Zahnheilkunde*, 1900, page 254.

FIG. 7.



Cross-section of human tooth. *a*, possible abscess-cavity; *b*, pulp-chamber. (Magn. 8 diam.)

All our experience in the conservative treatment of the dental pulp goes to show that such cases must be extremely rare, and that possibly, with exceedingly rare exceptions, there is little hope of bringing about a permanently healthy state in a pulp in which supuration has once taken place.

Interstitial cavities in the dentin, either of human or animal teeth, whether produced by absorption or by disease of the pulp, are an expression of some functional derangement of the soft tissue (pulp) or of some fault of development.

All the observations which I have made on the pathological processes in the tusks of the elephant, which are of a very extensive nature, as well as the studies of the few cases of cavities found in human teeth, have most decidedly confirmed my belief that no pathological process similar to that found in soft tissues ever takes place in dentin or enamel, and that all cases which have been so interpreted and designated as eburnitis are wrongly so called, and are nothing more than an expression of pathological processes in the pulp itself.

The second anomaly which I wish to refer to is of an altogether

different nature, and one the like of which I have not met with in any publication. The specimen was found among a lot of old teeth of unknown origin, and appears to be an upper third molar. The roots of the tooth coalesce throughout, and the palatal root, which extends about 2-3 mm. beyond the buccal roots, has on its inner curvature, and extending from the neck to the tip of the root, which it slightly overlaps, a ridge of enamel about $2\frac{1}{2}$ mm. broad at the base, $\frac{1}{2}$ mm. thick, and crescent-shaped in cross-sections. Fig. 8

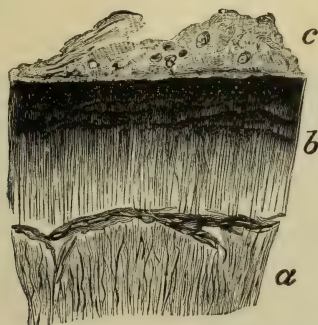
FIG. 8.



Molar showing ridge of enamel on root.

presents the tooth in natural size, and Fig. 9 a segment of a cross-section under about fifty diameters. Under the microscope, the enamel looks normal in structure, and in parts of the section its external margin is seen to be covered by a layer of soft tissue (probably pericementum or remains of enamel-organ), the structure of which could not be well determined since the specimen had lain dry for years.

FIG. 9.



Portion of cross-section of the root shown in Fig. 9. *a*, dentin; *b*, enamel; *c*, pericementum or remains of enamel-organ. (Magn. 50 diam.)

Where the enamel is present, the cement is wanting. It will be remembered that the investigations of Hertwig on the dental system of the amphibia; of von Brunn on the roots of the incisors of rodents, and of Röse and others on the human teeth have led to the conclusion that the primary function of the enamel-organ, for which the name epithelial sheath has been proposed, is not to produce enamel, but to give form to the tooth, and that "normal dentin is formed only on the inner wall of an epithelial mantle. As soon as the epithelial sheath ceases to grow, then the formation of tubulodentin ceases, osteo-dentin, cement, or bone taking its place." The roots of the human teeth are accordingly formed within a mantle or

sheath of epithelium. That this sheath should, under certain conditions, extend its function of forming enamel beyond the normal limit is not a matter of great surprise. We see evidences of this in the enamel-drops of the upper molars, and it is evidently the explanation of the anomaly which I have presented here.

The third anomaly is remarkable for its size, as well as for presenting no less than three structural peculiarities. As to the history of the tooth, I could only learn that it was found in the jaw of an adult in place of a left upper canine, which it most nearly approaches in form. Figs. 10 and 11 give a frontal and lateral view of the tooth in natural size. It is 27 cm. long, 1.1 cm. broad, and 1.3 cm. thick, and the crown is divided by a series of grooves and indentations into eight lobes.

Sections were cut by means of a diamond disk and very fine saw from different parts of the tooth, and ground down for microscopic examination. The intervening segments of the tooth were set together again by means of layers of oxyphosphate cement

FIG. 10.



FIG. 11.

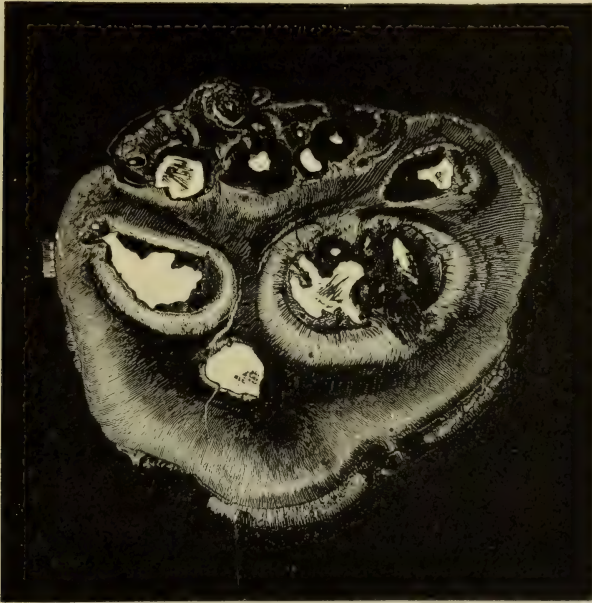


corresponding in thickness to the sections which had been sawed out, and the tooth in this manner completely restored,—a method which I frequently make use of with great satisfaction.

Two of these sections are reproduced in Figs. 12 and 17. A microscopic examination revealed the fact that some fifteen columns of enamel were suspended, something like stalactites, from the dome of the enamel-caps, some of them extending into the root a quarter of an inch beyond the neck of the tooth. In cross-sections the columns appear roundish, triangular, or compressed, and of various sizes, usually *hollow* (Fig. 13), though some contain a core of a very irregular osseous substance, and some a structureless mass, apparently resulting only from a deposit of calcific matter in the remains of the enamel-organ after it has been partially cut off from nutrition.

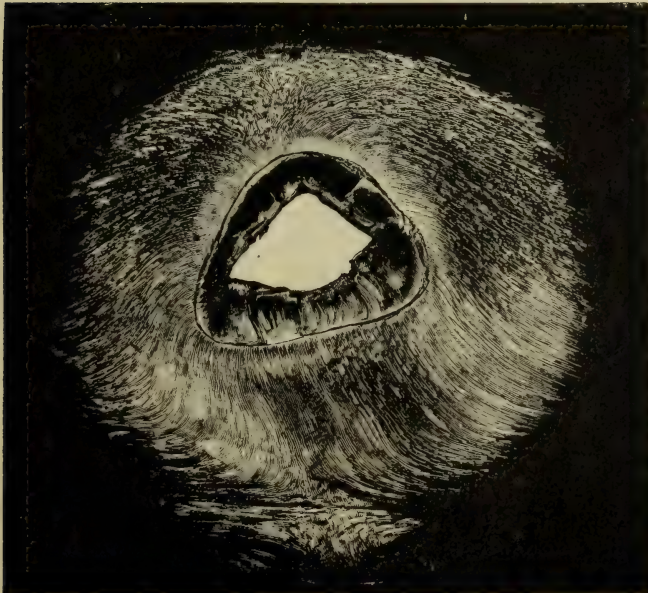
It must be remembered that in these columns the formation of enamel took place toward the center of the column, centripetally, and the remains of the enamel-organ are therefore to be looked for on the inner surface of the enamel. In Figs. 13 and 14 two of the enamel columns are presented in cross-section. In Fig. 14 we see a ring of enamel, followed by an osseous substance containing lacunæ with long processes, which give the appearance of having originated from the star-shaped cells of the enamel-organ. Inside of this is the core of uncalcified tissue, representing the remains of

FIG. 12.



Cross-section through the crown near the cusp. (Magn. 10 diam.)

FIG. 13.

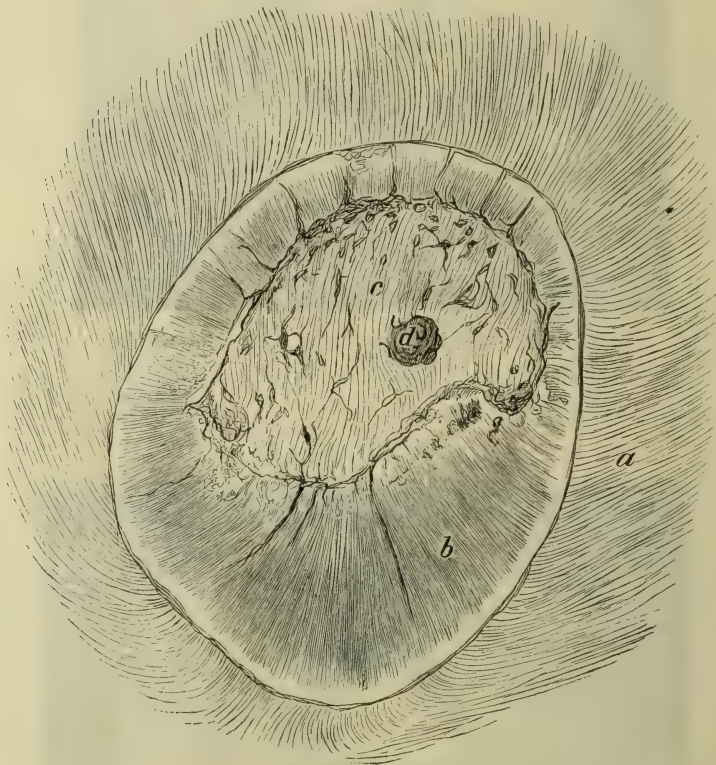


Cross-section of hollow enamel column with surrounding dentin. (Magn. 75 diam.)

the enamel-organ. Resorption figures, which remind one of those which have been presented as eburnitis, are also present (Fig. 15).

The dentin of the tooth was deposited not only in the ordinary manner on the surface of the pulp, but also each enamel column formed a center of calcification, from which dentin was formed centrifugally. We have accordingly some fifteen centers of dentinification, and as many columns of dentin formed from these various centers, some of which, failing to coalesce, give rise to a number of fissure-shaped pulp-cavities. All these different formations repre-

FIG. 14.



Cross-section of enamel column. *a*, dentin; *b*, enamel; *c*, calcified enamel-organ; *d*, uncalcified core of enamel-organ. (Magn. 100 diam.)

sent the crowns of so many teeth turned inside out, the enamel being on the inside and the pulp-chamber on the outside of each separate crown.

A further anomaly presented by this tooth is the absence of enamel on one side of the crown and the presence of well-formed cement corpuscles in the corresponding part (Fig. 16).

The third anomaly presents itself in the following peculiarities: On looking into the open apical foramen, which is about 2 x 3 mm. in diameter, we see the point of an acicular formation attached to one side of the wall of the root-canal, which we may call a root

within a root. It is seen in cross-section in Figs. 17 and 18. This root consists, as all roots do, of dentin and cement, but with the

FIG. 15.



Absorption figures in the dentin of the crown. (Magn. 100 diam.)

FIG. 16.



From the crown of the tooth. *a*, dentin; *b*, well-formed cement; *c*, structureless calcific matter. (Magn. 100 diam.)

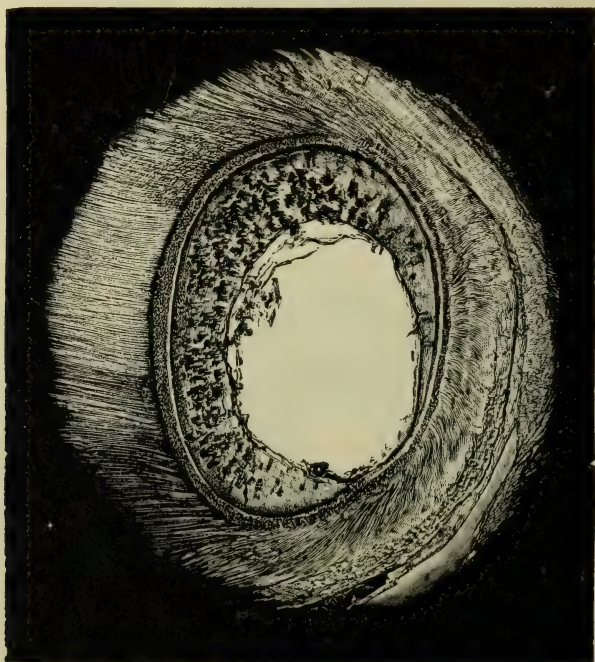
remarkable peculiarity that the cement lines the inside instead of the outside of the root. The inverted root represents the continua-

FIG. 17.



Cross-section of root in outline. *a*, pulp-canal. The dark portion represents the internal root, *b*, its canal. (Magn. 10 diam.)

FIG. 18.



Cross-section of internal root, showing lining of cement, stratum intermedium, and surrounding dentin. (Magn. 60 diam.)

tion of one of the enamel columns, and we have accordingly the same condition of being turned inside out as in the crown portion.

ON "LEPTOTHRIX RACEMOSA" BEFORE THE THIRD INTERNATIONAL DENTAL CONGRESS, PARIS.

BY F. VICENTINI, M.D., CHIETI, ITALY.

I AM twice indebted to Mr. J. H. Mummery for his previous reviews on this subject, reported in "Transactions of the Odontological Society of Great Britain" (January, 1894, pp. 73-81) and *Journal of the British Dental Association* (May 15, 1897, pp. 219-223), as well as for a practical verification of the facts alleged by me as the result of studies in this field since 1893 in conjunction with Professor Miller. I was made acquainted during the past year with Mr. Mummery's paper, accompanied by lantern projections, read before the International Congress at Paris August 8, 1900, by some abstracts given by the *British Journal of Dental Science* (August 15, 1900, pp. 721-727), by the *DENTAL COSMOS* (September, 1900, pp. 893-895), and by *Comp. rend. du Congrès* (fasc. 3, pp. 49-51).

Lately, by the kind favors of Professor Michaels and Dr. Sauvez, of Paris, I have received Mr. Mummery's communication in full, and, while thanking the author, together with Dr. Schwartz, of Leipzig, for the attention which they have directed to my work and for the justice done to my descriptions, I now take the liberty of presenting some comments on Mr. Mummery's paper.

The remarks of the author are partly of a general or theoretical character and partly special or technical. As to the first, Mr. Mummery, like the other critics, has not forgotten to regret that my "claims for the great importance of this organism (*Leptothrix racemosa*) have rather tended to discourage further research on this interesting subject."

But what is the foregoing affirmation but another way of pointing out the intrinsic opposition between the facts alleged by me and the current doctrine of the day? This opposition lies *in the facts themselves* rather than in any preconception of my own, as we shall see later. "However much we may be disposed to reticence," says Dr. J. L. Williams, "it is impossible to avoid asking what becomes of the enormous number of micro-organisms of different forms and sizes which are being constantly shed into the mouth by this parent organism, and how many of them have been classified as permanent species" (*DENTAL COSMOS*, 1899, p. 346). Hence I return to ask, Must the facts, according to our critics, be adapted to the theory, or rather the theory to the facts?

But, in a further passage, Mr. Mummery himself tempers his criticism by saying that "in future no student of the flora of the mouth can afford to ignore this organism, as its great abundance would seem to indicate that it must bear some very important rôle in the human economy, and that whatever deductions may be made from Dr. Vicentini's discovery, it is certainly a very interesting one to bacteriologists, for we have growing in the greatest profusion in every mouth an organism which appears to be on a much higher scale in the vegetable kingdom than the small elements, filaments, cocci, and bacilli, to which our attention has almost exclusively been directed."

Of the same, and even more explicit, opinion was Dr. Williams, as I have related in previous articles in this journal. I have already cleared up this point in the work itself and in the articles referred to, so that it will be sufficient to refer the reader to the respective passages.

Another remark of a general nature made by the author is the quotation of Zopf's, Naegeli's, and Flügge's views, indicating an eventual simplification of the bacterial species like that suggested by me. I am pleased that in this third paper Mr. Mummery seems to recognize such views as not "so revolutionary" as he feared in his first article, but simply as a reversion "to the previous views of the first investigators, whose morphological study of bacteria was abruptly abandoned by modern bacteriologists in order to follow almost exclusively the phenomena connected with their biological action on infectious diseases," as I said from page 159 to 166 of my work,—omitting the remainder, which would carry us too far. Only the author should have added that the said simplification of bacterial species as foreseen by Zopf, Naegeli, and Flügge was merely an uncertain and hypothetical one; while at present, in our *racemosa*, we are confronted with an actual and striking example of an undeniable parent organism by which many different forms of bacteria and bacilli are constantly shed into the mouth, as we have just now seen. The common derivation of such an enormous number of cocci, bacteria, bacilli, and rods of various sizes and shapes is, I repeat, a fact of the most intuitive and undeniable or (as we say in Italy) *palmar* evidence, as I stated at page 192 of the work. "If the minute cryptogamic plant which I described exists," I ask, "where shall we place its various particles, detached through ripeness or removed by injuries (as spores, sporids, gemmules, chains, filaments, inclosed bacteria, and male elements), if none of the isolated bacterial forms belong to it? It is, I think, easier to suppose a common derivation of these isolated forms from the same plant (like fruits or leaves fallen from the same tree) than their special and altogether distinct origin from without."

Dr. Williams, in his turn, emphasizes the same conclusion in some interesting passages quoted by me in answering Mr. Goadby's article (see DENTAL COSMOS, 1899, pp. 345-348, and 1900, p. 722). But Mr. Mummery seems not to be fully satisfied upon this point, and in his communication calls for further inquiries in order to ascertain, one by one, by culture methods the derivation of the single scattered or isolated types of mouth bacteria,—because, he says, "without culture experiments there could be no certain evidence for us of the direct descent of so many varied forms from this single organism."

Now, I have already stated the insufficiency of culture and inoculation methods for the classification of bacterial species. What may be the real value of so-called pure cultures and how we may understand the inoculation experiments was shown by me from page 203 to page 216 of the work, and I would not repeat here the same statements, but I am forced to restate some explanations of difficulties already solved that reappear the moment I think I have over-

come them. If one or more trained bacteriologists wish to undertake such an endless series of trials, we have nothing to object, provided that their work shall not be so directed as to divert the question from its proper line,—*i.e.*, to confine its examination within the laboratory walls, as I have said elsewhere. It was because of the unnatural life conditions upon artificial soils and through artificial surroundings that for the last two decades the natural history of bacteria has been to some extent misunderstood, through a jumbling of experiments and assumptions which do not provide room enough for the right observation and understanding of the natural phases and behavior of these microscopic organisms.

It should be remembered that the so-called pure cultures are but so many examples of a single and identical phase of bacterial life,—*i.e.*, the immersed, dissociated, and wandering or creeping state (as stated at pp. 115, 116, 159, 164, and 181 of my work and elsewhere),—a state which appears to be destined to spread the species *extensively* when it cannot do so *intensively*, and under which conditions all bacteria are more frequently met with and are more commonly known. By this method of study a thousand or more so-called species of bacteria have thus far been registered, as Dr. Williams stated (*loc. cit.*, p. 331), and it would be very regrettable if the same method should now be applied to the new organism.

But the difficulty advanced by Mr. Mummery is, I think, more apparent than real, because the identity of the cocci, bacteria, bacilli, rods, filaments, and chains, wandering in the mouth, with the respective particles (of exactly the same features) that we see daily growing upon or within the *racemosa* stems, needs neither further proofs nor special culture experiments for its determination, any more than the kindred of a swarm of bees with their own queen needs apposite demonstration.

This, as I stated before, is an admission of the most intuitive and palmar evidence, and the open and unprejudiced mind of the author comes substantially to agree with it by emphasizing the great importance of our new organism that implies its intimate relation with the great majority of the mouth bacteria. But, amidst this crowd of bacterial elements, we meet with at times some special types, endowed with true or supposed pathogenic qualities (pneumococcus, for instance, or Koch's bacillus), that could at a first glance be referred to a foreign source.

It is precisely this which is the battle horse of the system, though microbes of exactly the same features can be found in all mouths, even in the most vigorous health (see, among others, Lanceraux, "On the Causes of Tuberculosis," *Bull. de l'Acad. de Méd.*, séance of April 2, 1901).

But I would advance on this point another observation of prime interest which seems to have been overlooked by the author,—*viz.*, that even for these special types of bacteria the position of the question relating to their source is now thoroughly changed from that of the last two decades by considering, first, that we find actually growing upon the teeth a parent organism which thrives and fructifies in every mouth by a trillion and six hundred billions of *ears* or

racemes (see DENTAL COSMOS, 1900, pp. 722, 723), so that the entrance of other foreign elements becomes a very improbable one; and, secondly, that we have by this fact acquired the proof that bacteria can thrive not only in a monocellular or dissevered condition, but even in a more complex and higher one, and therefore they must be classified in accordance with their fructification type rather than with other criteria.

On the other hand, the insufficiency of the criteria till now adopted for the purpose (viz, the results of coloration and inoculation methods), was already shown by me in various passages of my work. Thus at page 55 I showed that colorization and decolorization are nothing but chemical phenomena, which cannot be elevated into biological characteristics; and at page 216 I related the experiments of Professor Spina in fixing stains by the aid of tannin or other substances. At page 250 of the Italian edition (*Atti Accad. di Napoli*, tomo liv, 1900) I noticed some shades of the tint in certain tubercle bacilli, as well as an unequal colorization or fading, under nitric acid and alcohol, of certain articles in comparison with the others in a single bacillus. All bacteriologists know, besides, that while certain bacilli are affected by the stain, their so-called spores may remain uncolored. Thus the nuclei are differently affected in comparison with the cell bodies; thus in various drawings of mine different segments of the same bacterium or bacillus appear uncolored or differently stained.

On account of the so-called pathogenic properties, though mostly unknown, the causes may be numberless by which a bacterial culture can prove hurtful to animals experimented upon. But, in the first place, I have already shown that in common diseases of man (unconnected with some specific virus, for instance pneumonia) the hurtful effect of the inoculation of their products upon the animals appears to be chiefly referred (*a*) to the decomposition of the culture-medium, as broth, gelatin, agar, serum, etc. These media are nothing but so many dead organic matters, or living ones but destined to decay and perish soon after being separated from the living economy that supplied them. The sterilization may have transitorily suspended such decomposition, but decomposition must initiate or recommence as soon as fresh infected matter, as, for instance, a diseased product, any refuse or cadaverous product (pus, sanies, sputum, etc.), ejected or removed from a morbid seat, reaches it by the infection act. And the above culture-media will then become more incongruous to life by being sowed with this infective matter (taken, together with accompanying bacteria, from a morbid seat of a diseased or dead body), a product, after all, destined to be *eliminated* by the affected organism rather than *grafted* to a sound one (*ibid.*, pp. 210-212). We can only conjecture that when in a culture-medium bacteria counteract the decomposition process by assimilating its products, and the vital resistance of the animal is at work, the latter may escape death, but succumb when either bacteria or the polluted material grafted on the culture-medium enforces, on the contrary, the decomposition process and the vital resistance of the animal is overcome. And by this we may

understand why a pure culture of the micrococcus of sputum septicemia kills a mouse or a rabbit, whereas a pure culture of some other bacterium from the same mouth may have no action at all (see pp. 190-192 of the work).

But, besides the decomposition of the culture-medium, another factor of the hurtful effects in question may be (*b*) the huge mass,—*i.e.*, the fabulous number (billions and trillions) of bacterial elements that are abruptly introduced by inoculation into the internal organs, where nature neither intended nor consented they should be. This huge mass is also out of proportion with the very small number of bacteria which, we are told, would be, one by one, inhaled from without or swallowed at the beginning of the incubation stage of our spontaneous diseases (*ibid.*, pp. 210, 215).

While this happens in common diseases, we meet with a third factor in infectious ones. In diseases of this second class, connected with a specific virus (for instance, tuberculosis), the hurtful effect of the inoculations appears to be referred, besides (*c*), to the grafting of the given virus carried in the culture-medium together with bacteria (*ibid.*, pp. 198, 199, 212). In these cases it is really the specific disease that is transmitted as such by means of the virus; but the condition was thoroughly different in the preceding ones, where no virus, but simply a corrupted material with bacteria, was transplanted. The contamination that followed resembled more a septic or cadaverous infection than a disease *sui generis*, so that nearly all experimenters came to attribute the pathogenic property (in an identical disease, for instance whooping-cough) to different forms or kinds of bacilli or spores, by which they thought to have reproduced the original disease *in all its characters*, confuting one another in turn, according to the different results of their various trials. I pointed out also the reason by which in those instances the bacteria, ejected or removed from a tissue or an organ (in the patient), will often tend to regain (in the mouse or guinea-pig) the tissue or the homologous organ, and so rivet in the mind of the experimenter the preconception of a typic disease being truly transplanted by means of bacilli (*ibid.*, page 213). I showed, besides, at page 211 and elsewhere, the insufficiency of successive transplantations from one culture to another, in order to eliminate the two causes (*a* and *c*) and revert bacteria to their original condition.

In the second place, while this happens in *artificial infections* purposely induced in the animals experimented upon, the case is thoroughly different in the corresponding spontaneous diseases in man, as daily exhibited by the clinic, whether connected or unconnected with a specific virus (*ibid.*, pp. 213-216), where the supposed aggression of bacteria from without has not yet been proved, and where bacteria neither precede nor accompany (according to Spina, Middendorp, and others), but only follow the disease (see pp. 195-199 of my work), in order to act upon the decayed cells or products of the morbid seat as scavengers or necrophagous agents (*ibid.*, p. 206 and elsewhere). Even in cases of true contagion, bacteria do not proceed from the external world, while the contagion or virus is carried from the sick to the healthy by the ejected material,

more frequently together with accompanying bacteria. The source of bacteria growing, for the second time, in the morbid seat in both classes of spontaneous diseases is probably from the same normal preserve thriving in the genito-urinary, digestive, or air passages. And thus it happens that the diseases affecting the annexed organs are precisely those which more frequently present this or that bacterial characteristic. On the contrary, various other (even infectious or more distinctly contagious diseases, for instance eruptive fevers), unconnected with the normal preserve of bacteria, are till now wanting in any bacterial characteristic whatever.

But we may also remember that the hurtful properties of bacteria were referred by Jaccoud, by Pommay, and others to an accidental deviation of their activity, acquired in the morbid seat from which they were taken, rather than to an original and intrinsic virulence (*ibid.*, pp. 149-153, 193-195). Of the same opinion appears to be even at present Professor Lanceraux (see the quoted article) in regard to tubercle bacilli, while Dr. Mays claims phthisis and pneumonia in the great majority of cases to be substantially due to neurosis, and to be treated chiefly with counter-irritants over the vagi (see "Pulmonary Consumption, Pneumonia, and Allied Diseases of the Lungs," New York, 1901). We may likewise remember the experiments of Stoker on some beneficent rôles of staphylococci and streptococci upon the healing process of ulcers of the leg or foot (*Journal of the British Medical Association*, 1895); those of the late Professor Kanthack before the same association at Liverpool (1896) on *B. coli* as a natural inhabitant of the digestive tract, whose absence or reduction in number must, according to him, be regarded as a departure from perfect health; and those of Dr. Kijanizin upon animals exclusively supplied with sterilized food and water and sterilized air, whose common fate was death (see Mr. M. L. Johnson, *Westminster Review*, September, 1900, p. 326). And when we remember that the same Pasteur did not regard bacteria as originally pathogenic, we may repeat with Charrin, "Ne crions pas tant aux microbes, mais voyons en nous-mêmes le rôle du chimisme vital" (see Michaels, "Essai de Sialo-sémeiologie," *Congrès Dentaire*, 1900, fasc. 2, p. 29).

But, even when the pathogenic properties are intrinsic and original, I think they could scarcely be elevated into a distinctive criterion of some independent botanical entity of this or that bacterium. I showed at page 109 of the work that different particles or cells of the same micro-organism may need various nutrient media, and may liquefy certain substances and separate others of a very different nature. Again, the possible affinity of saprophytic bacteria with pathogenic ones are admitted by one of Professor Koch's disciples. "The distinction" (writes K. Fraenkel) "between pathogenic and non-pathogenic bacteria is not so absolute as it at first appears. We know that a fair number of micro-organisms which seem harmless may, in given circumstances, become pathogenic; and we also know, on the other hand, that some pathogenic species may lose their pathogenic properties and form a series of harmless bacteria." And elsewhere, "Considering that all pathogenic bacteria

in a period more or less distant were lacking their pathogenic properties; that even the parasitic micro-organisms had originally to lead a saprophytic life; that the pathogenic action depends on a special adaptation to the nutritive conditions, we might consider the loss of this property as a reversion to their old method of existence. It is clear that the tendency of the species to lose the virulence is different, and that some keep it up longer than others. But, for all, the virulence constitutes only an accessory, liable to increase or decrease, according to circumstances. Therefore, the differences in the virulence cannot assist us in separating, the one from the other, identical species of bacteria" (*ibid.*, pp. 208, 209).

It is not my fault, I repeat, if I have been forced to resume these explanations, though as briefly as possible, in a short article. Now, in considering that by the above facts a classification of bacterial species cannot be absolutely arrived at on the ground of culture and inoculation methods alone, the question advanced by Mr. Mummery appears to be put inversely, as, before admitting the source of the so-called pathogenic bacteria from without, we are justified in requesting of our opponents a negative proof to show that the said bacteria are not derived from the same ultimate source as all the others. In other words, instead of being charged with the burden of a direct or affirmative proof,—viz, that the above bacteria ARE appurtenances of our *racemosa*,—we hold that our opponents should be charged as challengers, with the reverse or negative one,—viz, that the said bacteria ARE NOT appurtenances of the same organism, unless these same opponents or others should succeed in detecting some other parent organism from which the above bacteria might eventually proceed.

Until that negative proof or this exhaustive determination of another parent organism shall be given, the question will remain open. And to solve or close it will be henceforward a matter of further inquiries, provided the solution be afforded by a morphological and careful study of the whole life-history of the said bacteria rather than of the single conditions of their dissevered state by cultural and inoculation methods alone. Thus on this further, though unpurposed, line of researches some ramification process was reached by Professor Klein, by Coppen Jones, and others in tubercle bacilli, as I said elsewhere, and Gasperini and Rossi-Doria looked upon them as some *Streptothrix* old forms. Thus other observers noticed, as well, filamentous sprouts arising from pneumococci.

Coming now to the particular or technical remarks of Mr. Mummery, we meet with, first, the question of the peduncles in fruitful heads. The difficulty experienced by the author in detecting these thin threads was overcome in his communication by the photographic evidences previously given by Dr. Williams, which were shown before the Congress by lantern projections. I have already cleared up this point in the previous articles, so that I am relieved from recalling here the same statements as to the difference between

the direct observations and the photographic images, as well as between the apochromatic object-glasses and the one-twenty-fifth-inch achromatic immersion lens I made use of for this special research. Only I will observe that the iodine solution employed by me was not "a one per cent. lactic acid solution, followed by tincture of iodine," as the author states, but a drop of pure lactic acid, followed by one or two drops of a watery solution of a five per cent. iodurated iodide of potash (see pp. 70 and 169 of the work). I am quite sure that by this method of staining and by the above achromatic lens with a No. 1 Huyghenian eye-piece anybody will be able to distinctly perceive the peduncles in question, provided the best illumination method be adopted and the searching chiefly directed upon the isolated fruitful heads floating in the interspaces between the clods or along the edges of the preparation, whether, by their lightness, they are impelled. This for the reason that these isolated heads show their peduncles more nicely. But no less evidence of the said peduncles can be reached by gentian violet or other stain, as I intimated in various passages of the work and as my drawings plainly show.

Mr. Mummery recalls, besides, the remark of Dr. Williams upon the fact "that hundreds, and it may be said thousands perhaps, of expert bacteriologists have worked for years at these problems without discovering this important organism," as well as his opinion that this "was entirely due to the other fact that nearly all bacteriological specimens were mounted in balsam, a method almost certain to destroy these fructification heads" (Williams, *loc. cit.*, p. 348).

But I have already pointed out the proper and thoroughly different source of the inadvertence alluded to. It was rather on account of the carelessness in collecting the *patina*, by scraping it deeply, that the fruitful heads growing in its upper layers were first entangled in the huge mass of lower stumps (*Leptothrix buccalis maxima*, Miller), and it was because of the excessive trituration of the collected material, in coloring and mounting, that they were afterward totally destroyed, so that only the dissevered particles, with the other wandering bacteria and lower stumps, remained in sight. This method of handling was, in its turn, nothing but a practical consequence of that fundamental misconception about the *botanical entity* of bacteria (now become axiomatic in bacteriology), by which the latter were assumed as simply monocellular organisms, without any suspicion that they might be, on the contrary, so many scattered particles of more complex ones (see DENTAL COSMOS, 1900, p. 221). Hence in the proportion that the *patina* was broken and dissociated upon the slide, more evidence was hoped to be reached on account of the isolated bacterial elements, which were assumed as so many independent beings. And that the mounting in balsam had nothing to do with the inconvenience in question will plainly appear by a simple consideration (which I omitted, as very obvious, in the quoted article,—viz, that all the temporary specimens of buccal contents for daily examination of their bacteria were usually mounted by the *wet process*, as at

present, *i.e.*, in saliva itself or in other watery vehicles and stains, only the permanent ones being sometimes mounted in balsam.

I am pleased that, in following his communication, Mr. Mummery comes to refute the suggestion advanced by Mr. Goadby, in order to the classification of our *racemosa* as a form of *Crenothrix*, and to the supposed identity of the *racemosa* transverse views with zooglœa masses referred to *Crenothrix*. This for the two reasons expounded by me,—viz (1), that the transverse sections alluded to are implanted *around a stalk*, which is not the case in the zooglœa masses of *Crenothrix*; and (2) that the single cell bodies of the above zooglœa masses are beyond comparison more bulky, and have nuclei within them (see my answer to Mr. Goadby in DENTAL COSMOS, August, 1900, p. 710). These remarks were made by Mr. Mummery and myself independently the one from the other, inasmuch as my foregoing answer was printed in the same week when Mr. Mummery read his address before the Congress.

He then concludes that the term *Leptothrix racemosa* proposed by me appears to be sufficiently descriptive of the new organism, and hence to be retained.

At the end of his communication, the author regrets that my work was unaccompanied by photographs, and to this want would refer the indifference of the bacteriologists to the same. But how could this want of photos have discouraged researches upon facts that everybody was in position to ascertain by direct observations after nature, like those which were accomplished by the author himself, by Professor Miller, by Dr. Williams, and others?

It was no doubt through being unable to find any satisfying reason of this indifference rather than for the little value of my humble work that Dr. Williams was led to "regard it as being to the discredit of the scientific world that Dr. Vicentini's work should have been so completely ignored" (*loc. cit.*, p. 348).

On the other hand, my work was begun during 1888, when the chromo was the best illustration method. Nevertheless, the fourth part, or appendix, written in 1895, was accompanied by a photograph taken by Professor Miller (see Fig. 31, p. 187 of the work). For my part, far from minimizing the importance of the photographic work (its inconveniences being, in other respects, well known), I think even at present no good drawing or conscientious description ought to be discarded simply for want of a photo. At any rate, this want being now supplied by Dr. Williams, it is to be hoped that no further difficulty will henceforward prevent the study of the new organism.

And when the two fundamental questions relating to this study—viz, the question of the facts and that of their interpretation—shall be solved, then we may successfully enter the field of a right classification and of a right conception of the botanical entity of bacterial species,—as I have touched upon on various occasions.

GOOD RESULTS OBTAINED BY THE EXTRACTION OF FIRST PERMANENT MOLARS OR OTHER PERMANENT TEETH. .

BY W. D. TENISON, D.D.S., NEW YORK.

(Read before the First District Dental Society of New York, November 13, 1900,
by the Secretary.)

IN presenting my ideas on the advisability of extracting, under certain conditions, permanent teeth, especially the first permanent molars, I do so because the subject has been brought before the profession in a very prominent manner by papers read and published in our leading journals and sent broadcast all over the world condemning the extraction of any permanent teeth, and producing in the minds of the younger practitioners a prejudice in favor of one particular line of practice, they looking to us old practitioners for the advantages gained by experience.

I therefore think it is time the other side of the subject should be presented, and I hope to be able to-night to convince many that the extraction of the first permanent molars in many cases is the best treatment we can practice. In addition to what I may say on this subject purely from a practical point of view, I will demonstrate what I claim by models taken from the jaws of my own patients. I will also present models of patients who have come under my care showing the bad results of not doing so, repeating what I have often said of late. Had I supposed years ago that this subject would have come up for discussion in our societies I would have taken impressions before extracting, but, unfortunately, I did not do so, therefore can only show you results.

I wish to state that I do not take a radical stand and hold that first permanent molars should always be extracted, as the other side claim they should never be,—or, in fact, any permanent teeth. In all conditions I refer only to extraction in child life.

I have found during a practice of forty years that we cannot follow any ironclad rule in the treatment of the organs we are called upon to care for, and our honest effort should be to do the best we can in our judgment for the future comfort, health, and welfare of our patients, so that when we are about to close our earthly career we can feel that, without regard to monetary considerations, we have done the best we could. I have yet to feel that I have done an injury to a patient where in my judgment it became necessary to extract, and I will say now that I have practiced it in very many cases, always taking into consideration the age and conditions found on examination.

The first impression I received of the benefits to be derived from the extraction of first permanent molars was about thirty years ago, a short time before I had returned from Paris, where my early years of practice were spent. One day I was asked by a patient connected with the Leake and Watts Home for Orphans, then located where the Episcopal cathedral is now being built, if I could spare some time each week to help the little ones there. I gladly accepted, as a duty to suffering humanity. The institution had no conveniences for doing any kind of dental work, so all that

could be done was to extract first permanent molars from which a large number of the children were suffering. To my surprise, on seeing several of them thus treated a few years later I found the majority to have the remaining teeth regular in position and in good condition, with very few decays.

Let us now look at the condition we often find and see what is our duty. Children ranging from nine to twelve years of age are brought to us suffering from toothache, and a request is made to examine and see what is the cause, which we often find to be from a deciduous tooth, but more frequently from decayed first permanent molars with exposed pulps. When we so state a response comes, "Oh, no; that cannot be, as the child never lost teeth where they are." This condition we see almost every day in consequence of the neglect of child or parent to take care of the teeth, presuming they are temporary ones; but all at once they awake to the fact of the consequences of such neglect. We are then asked what is best to do. That is the question to settle: extract, or retain such teeth in the jaws. Let us look for a moment at the conditions that may exist: exposed pulps, teeth of poor quality, and all showing a tendency to decay; or the teeth may be in a crowded condition. If such conditions existed, and the child is at an age when the second molars are about to erupt, I would extract all four first permanent molars, even though all are not decayed, unless there is some very good reason for not doing so, such as one jaw being unduly developed as compared with the other.

A few years later, after such treatment, we find as near as possible a perfectly regular set of teeth, good articulation, few or no decays, not a dead tooth in either jaw, perfect comfort to the patients, who are able to masticate their food perfectly and, so far as the teeth are concerned, are in perfect health, with no flattening or contractions of the arch, no straightening of the lines or shortening of the teeth, as has been claimed by those who denounce extractions.

Let us follow out the theory of non-extractions under similar conditions. First, treatment of exposed pulps and consequent death. No matter what the treatment may be, you will have dead pulps to contend with sooner or later, and who can say what the outcome may be from a devitalized tooth. I have seen many cases where they were comfortable and useful teeth for years, but you cannot count on them. They are a constant source of danger, and very often have to be extracted at an age when gaps are left, and tipping of the remaining second molars occurs. We see any number of such cases with great discomfort to patients, leaving them unable to properly masticate their food, consequently bad digestion and bad health.

We will suppose a case where the first permanent molars and other permanent teeth are in good condition, but decidedly crowded, pressing against each other, throwing them out of their normal position, preventing a proper development of the enamel at the points of contact and proper cleansing of the teeth. Those opposed to extraction will suggest the spreading of the arch, thereby easing

off the pressure and separating the points of contact. This can be done, but let us consider what that entails.

First, to most of us our fees are of some consideration for the vast amount of work to be done, and very few are able or willing to pay a dentist what such services are worth. Even if they are willing to do so, very few children will submit to the torture of such an operation; some are so nervously and delicately constituted that it would endanger their general health, maybe permanently. I have done it in few cases. Second, the wearing of plates or other appliances is liable to injure the whole set by constant pressure and retention of food, etc., as I have often seen.

Retaining plates have to be worn sometimes for a year or more after the regulation is completed, and are a constant source of danger to the soft young teeth by retention of food, etc. It is almost impossible to get a child to be careful in keeping the teeth properly clean to avoid the danger of decay. If we can avoid all this by the simple extraction of first permanent molars, or even other permanent teeth, why not do so?

In discussing this subject from a monetary consideration, I must confess the fees are small, if any; but, as I have already said, it is our duty to do the best we can for our patients who place confidence in us, and I think any honest-minded dentist will do that without taking into consideration the question of fees, even though we may differ in our mode of practice.

I have read with much interest a paper from the pen of Dr. E. A. Bogue, illustrated by photographs, which was read before the National Dental Association August 1, 1899, and published in the DENTAL COSMOS of December, 1899. I should like to have had the time in the preparation of this paper to answer in detail all the points claimed in his. Being occupied otherwise, I have been compelled to merely take up a few of the more important factors, leaving the rest to be elucidated in the discussion to follow.

I wish Dr. Bogue to know that whatever criticisms I may make on his paper will be in no spirit of antagonism to him, but to this particular method of practice. I will first say I cannot see anything in the entire paper to change my views as to the benefits to be derived by the extraction under certain conditions of permanent teeth, especially the first permanent molars.

As I understand his paper, he begins by presuming that the teeth and jaws have developed or will develop normally in a healthy condition, and he speaks of that condition in the first part, page 1218. It appears to me his arguments follow that line of thought. If such is his idea, and we could always find such perfect conditions, there would be no necessity for this discussion. As we will all admit, it would be wrong to extract under such conditions except for some very important reason, but, unfortunately, nine-tenths of the teeth we see are not in that state. In his photographs he shows tipping of teeth and spaces left by the extraction of first permanent molars, also center lost by the extraction of a permanent tooth on one side. This only confirms my position on this subject. I can show you the same results to-night by models I have here. Why

do we see it? For the following reasons: Bad judgment on the part of some dentist, or the patient getting into the hands of one of those advertising concerns who will extract one, two, three, or any number of teeth the patient is willing to pay for, some of which, had they been extracted at an early and proper age, would have prevented the unsightly and discomfiting conditions we so often see. Dr. Bogue says in his paper that the extraction of permanent bicuspid or first molars causes a flattening of the front of the mouth, reduces the vault of the arch, straightens the lines of the teeth, shortens the bite, favors breakage of the teeth by preventing, as he expresses it, their meshing as they come together, also a wearing down of the cusps, and, lastly, narrows the arch to such an extent as to prevent proper speech and the power of vocalization. I think I shall be able to demonstrate to-night by my models and other means the contrary of all this.

At the bottom of page 1226 he begins to describe six photographs of a protruding upper jaw regulated by the extraction of first bicuspid, shown on pp. 1228 to 1230 as Nos. 14A to 14F, the last one showing a very good result, as I look at it. In the description of that case he says that after the extraction of the upper first bicuspid the second ones came forward and occupied the places of the first ones extracted, and that the first and second permanent molars followed, and finally the canines had to be spread *laterally* to make room for the pulling back of the centrals and laterals, to use his own words; that *after* the completion of the regulation the *canines held the same relative position* to the lower teeth they did *before* the regulation began. How can that be if the canines were spread laterally enough to bring in the centrals and laterals, as shown in the photograph? Would not the canines stand very much outside the lower teeth, which, according to the last photograph, is not shown? On the contrary, they are, as he says, in the same relative position in which they were before the regulation began.

On page 1231, photographs 15A and 15B, he demonstrates another case of protruding upper jaw regulated without extracting any permanent teeth, and, to quote his words again, "it was accomplished in two months." It will be seen that the upper molars in this case have actually been *drawn back*. I cannot see how upper first and second molars could have been *drawn back*. I can understand how they could have been *pushed back*, but the force required to push back four upper molars might, in my judgment, endanger the life of those teeth and push the remaining teeth forward. Taking for granted that part of the work has been done successfully by putting the molars back, how would you hold them in that position until you pulled the others up to them, as we might have to use the molars somewhat to pull the others back, and in doing so would we not pull the molars forward again? But we will suppose that all the teeth have been carried back as represented in photograph 15B. How can we hold a full upper set of teeth back, especially as Dr. Bogue tells us the natural movement is from back forward; and in his denunciation of the extraction of molars or bicuspid lays great stress on the fact that where teeth

move forward—I mean the upper set, as he does—that the meshing, as he expresses it, is lost, causing all sorts of bad results, such as malarticulation, breaking of the teeth in after years, rendering the patient unable to masticate, etc.? Does not the same rule apply in this case, if true?

As to the time it took to accomplish such an undertaking,—two months,—I can hardly accept such a statement. I don't want to doubt his or any one else's word. I have done some regulating in my time, but I never attempted such an operation as here described, and I am quite sure if I did I could not have accomplished it in two or many more months. And even then, think of the torture that patient had to go through, not to mention the danger of killing the teeth, which might follow such heroic treatment. How much more simple it would have been to extract the first bicuspid if all the posterior teeth were in good condition; if not, then to extract the defective ones and pull those six front teeth back, which have single roots, than to attempt to pull or push back *fourteen* teeth, four of which have usually three roots each, sometimes more.

As to narrow arches making it impossible to have good speech and the power of good vocalization, I will say that my *confrère*, Dr. H. R. Armstrong, introduced me a few weeks ago to a lady who has several sisters who, with herself, have very narrow arches, all except herself having had teeth extracted. They can talk all right, and are all first-class vocal artists. I think myself that a good broad arch would give better results than a very narrow one; still the fact remains as I have stated. The lady I met had about as narrow an arch as I ever saw, and she certainly could pronounce her words clearly and distinctly.

On page 1220, photograph No. 7, is shown a case of a child which I do not quite understand. It shows the teeth from the canines forward touching, and apparently two bicuspid and two molars in the lower jaw and the two bicuspid and one molar in the upper jaw, none of them touching by fully one-eighth of an inch; and he claims that was the condition the child was left in, after, I presume, the extraction of the first permanent molars, and in his remarks on the case says, "We are often called upon to place artificial teeth for the poor little victims to chew upon while the temporary teeth are being shed." That appears to me a very curious statement, as the time of extracting the first permanent molars, when it is done, is about the eleventh or twelfth year, or when the second molars are about to erupt and the bicuspid are far advanced in their eruption. I might say almost fully so, articulating with each other. If not so, would we place artificial teeth on top of them, even if we had the room to do so? Or, if by some mistake the first or second temporary molars were extracted before the temporary teeth were shed, would we put in artificial teeth for the poor little victims to chew upon, and thereby obstruct the eruption of the bicuspid? I confess I never saw or heard of such a case, although he says we are *often* called upon where such treatment is necessary. We live to learn.

There are no spaces shown in this photograph No. 7.

I can hardly suppose that the defective cases shown by Dr. Bogue, and of which he told me he had many more models, even into the hundreds of similar character, which were caused by the extraction of first permanent molars and other permanent teeth, can be from the jaws of his own patients. If they are I can understand why he condemns the extraction of permanent teeth in any case that may be presented to us. If the models *are not* from the jaws of his patients, how can he tell what conditions existed or the age of the patients at the time the teeth were extracted? We know as a fact that what we are told by patients coming from under the care of other dentists can seldom be relied upon.

Had I the time to prepare a longer paper I might go on and point out several more inaccuracies in his, as I understand it. I will therefore close by repeating what I have already said, that I believe the judicious extraction of first permanent molars or bicuspidis under certain conditions is one of the best services we can render our patients. In proof of which I will now show you models of good results where it has been done, and bad results where it ought to have been done but was not. I wish to impress on your minds that the models I show are from the jaws of my own patients.

CONSCIENTIOUSNESS IN DENTAL OPERATIONS.

BY WM. HIRSCHFELD, D.D.S., PARIS, FRANCE.

(Read before the American Dental Club of Paris.)

WHILE a student of operative dentistry with Professor Sachs, of Breslau, I remember one particular remark of his, which impressed me more than a great many hours of lecturing. Whenever his patients complimented him upon his work he invariably replied, "I cannot do any better than another dentist, only it may be that I am a trifle more conscientious than the average." This remark from a man like Professor Sachs, considered as one of the best operators in Europe, looked to me at that time—some twenty years ago—like exaggerated modesty on his part. But to-day, after years of practice, I understand these words to be only the simple truth, and that a good operator is almost entirely the result of conscientiousness in his work.

This same opinion must be shared by any one who will reflect a moment upon what conscientiousness in dentistry means. It means to perform every dental operation in such a manner as to secure the height of perfection. This is the ideal toward which every dentist should strive. This at least will be the desire of the student when he leaves college, but when it comes to the reality of daily practice then he soon finds out that the accomplishment of ideal work depends largely on three principal conditions:

First. The amount of fees.

Second. The capacity of the patient to bear pain.

Third. The individual skill of the operator.

These conditions, if not inadequately realized, are liable to unfavorably modify our results.

Let us first consider the question of the fee, since it is the very first obstacle encountered upon entering the profession. Young dental graduates are of two kinds: they are either conscientious by nature or they are not. In order to obtain their diploma they may, at the end of their studies, show an equal degree of skill in the work presented to their professors as examination fillings. But when they start in practice, and their professor is no longer behind them to control their work, then the question of fees is liable to profoundly modify their actions. They may be full of good-will and ability to do their best, but where the truly conscientious man will endeavor only to improve in his work, whether it be well paid for or not, the other man will first think, "Is it worth the trouble to do good work for the small amount I am going to be paid?" He may be convinced that his work is just as good if not better than that of the long-established *confrère*, and consequently think that he ought to be paid at the same rate. In all honesty, is this fresh, inexperienced practitioner entitled to claim the same reward as those who give their experience of years as a guarantee of successful work? I am sure and certain, gentlemen, that you do not think so. He will commence his practice generally with very limited means, and even less acquaintances. Some of them may pay him well, most will not; and his conscientiousness, if it does not form a part of his character, is sure to vanish with these first difficulties. They will become the pivot which will lift the really conscientious man up on the pedestal of a good operator, while they will turn the other into the crowd of the average workers.

To these young men may I assume the right to say here that a small fee is not any excuse for lowering the quality of the work. I do not mean to say that they should give a gold plate for just one-half of its average value, nor that they should make gold fillings for the price of cement fillings. No; what they should do at their *début* is to perfectly perform moderately paid operations, regardless of time and labor. They should make their gold fillings just as carefully as if they were going to show them to their teacher. Their amalgam fillings ought to be inserted with such minute attention to detail, and, above all, polished so that their color alone will distinguish them from faultless contour gold work. They should perform the operation of devitalization or treatment of dead teeth as well as if paid fully for every dressing, and so on.

The man who starts on such principles is bound to remain a conscientious operator. No matter how much practice falls upon his shoulders, he will always devote the necessary time for each case. In one word, he will establish the reputation in his profession of an honest man. Quite different will be the career of a dentist who will constantly excuse his work on account of its being insufficiently paid for. He will fall into the habit of doing easy-going operations, and if he finds even, later on, patients willing to pay for conscientious work, this will be difficult for him to do, since his skill will have been lost from ill-use.

Although this trivial money question may be liable to interfere at any time with the highest ideals of any dentist, it remains, after

all, with ourselves to regulate our actions by firm principles. It is perfectly in our power when we are once over the first years of our career to limit our time merely to those patients who will pay our work according to its value. When we have reached this point of professional life, then it should be our duty to direct patients with moderate means to those young *confrères* of whose honest intentions we are sure. This would be a good action to both the patient and the young operator, and by far more honest than trying to hurry through this cheaper work between better-paying patients.

Conscientious work is not always well borne by the patient, and this is the great difficulty which we meet with in a French practice. These difficulties are not caused so much by the more or less nervous temperament of our patients as their character as a nation. Our *confrères* in America will be rather astonished at this remark, but what they must not forget is that American dentistry has been invented and brought to its height by Americans in view of that one class of patients whose capacity to bear pain they are familiar with. The conditions are not the same in Europe. We dentists have to deal with two distinct classes of patients, the Anglo-Saxons and the Latins, who differ widely in their national characteristics. On one side are the English, Germans, Swiss, Swedes, and, in fact, all northern nations, who by judicious training will easily submit to our way of operating as we do it in America. On the other side are the French, Italians, Greeks, Spaniards, and all the other southern nations, whom no educating, no persuading, will ever bring to allow of the same thorough treatment as the Anglo-Saxons.

The causes of this marked difference between these two races are to be found, after Darwin, in the influence of the earth, the sun, the water, the whole climate in fact, which produce special features in the human character, different in every part of the globe. If you add to these natural influences a highly intellectual education, an over-refined civilization for the Latins, you will understand that they are hypersensitive people, and as a consequence their faculty to support pain is very much lower than with the Anglo-Saxons. It is my opinion that we must consider this marked difference between the two nations as the principal cause why the words "American dentistry" exist yet as an expression for a certain class of thorough dentistry.

Otherwise, if Anglo-Saxons and Latins would show the same physical qualities of endurance, the European dental schools would soon produce identical results in their practical education. But as for the present, we dentists in Europe are forced to assimilate our way of operating to the country we live in. Compare, for instance, the American with our French patients. The American who goes to the dentist goes to him with the idea of undergoing the operation of tooth-filling as it should be done. In his mind he expects his dentist to fill his tooth the best he knows how, no matter how painful or how long the operation may be. Now look at our French patients. In this country the patient who comes to our office has only one idea in his mind,—not to suffer. For him the greatest dentist is not the skillful operator who does his work

correctly, but the one who does not hurt, or at least gets through his work quickly. The result is that the great bulk of the dental profession here will have above all the aim in view to exclude pain from their operations. From a humane point of view no aim is more noble, but it may be at the expense of thoroughness. Since conscientious work does not always go without pain, and since there exists no absolute means yet to excavate teeth without more or less suffering, it is easy to understand that our ideals cannot always be realized here. The dentist who tries to do his work exclusively as he would do it in America is compelled to limit his *clientèle* only to patients willing to bear any pain as long as the operation will turn out successfully, and this class of patients will be made up only of foreigners and a minority of exceptionally-brought-up Parisians.

This statement is somewhat discouraging for those operators who will not submit to these conditions, conditions which no educating will ever change. The only thing left to do is to treat European patients according to their capacity to bear pain, which means to say that our rigid standard has to be replaced sometimes by tact and judgment. Take as an example children visiting the dentist for the first time to have their teeth filled. The well-brought-up, or at least the obedient child, will be easy enough to handle, and no special difficulty will arise in the filling of his teeth correctly, but this is an exception. Many children are spoiled and nervous, and will declare to us that they will not open their mouths unless they are assured they will not suffer. Under these conditions, where something has to be done anyhow, only one idea ought to prevail in our minds,—namely, to convince the child that teeth-filling is not painful. That of course cannot be reached in doing perfect work. We simply have to console the revolt of our conscience with the hope that gradually we will gain influence enough over the child so that later on better work may replace the first attempts.

We find more or less the same difficulties with adult patients here. The true Parisian ladies will almost make a condition of not being hurt, and a continual conflict between our desire to do conscientious work and the impossibility of doing it without pain will constantly occur to us. The use of the rubber dam, the engine, and the mallet will in a good many cases meet with such obstinate resistance that plastic work will be our last resource if we want to see our patient satisfied. I always remember the most characteristic answer which an old-established Parisian *confrère* gave me when I told him how unsatisfactory such plaster work must appear to the operator capable of doing better. He said, "Young man, we are not here to please ourselves, but to please our patients." And really a true Parisian practice will only be secured by those dentists who will carefully avoid long and painful operations. The Parisian will never be persuaded to consider pain as *une quantité négligeable*, whereas the American may find in this a sure proof of being conscientiously treated.

How great the fear of suffering is in Paris you have an amusing

proof by comparing the advertisements of dentists in France and in America. These estimable *confrères* will of course try to hit the vulnerable spot in the imagination of their readers, so they guarantee in France extraction, fillings, plate-work, any dental operation, in fact, without a particle of pain; while in America cheap gold fillings and plates are guaranteed to outlive their patients. This little observation taken from life shows you pretty well that the American patient demands good work, but the French painless dentistry.

If this universal cry after painless dentistry is really so pronounced here, are we all of us supposed to practice our profession after a rather slipshod manner? This is not my opinion, gentlemen. There exists one plan of procedure which will to a great extent take the place of painless dentistry, and that is to do conscientious work in limiting pain and time to the shortest amount possible. This can be accompanied by a light but steady hand; a practical arrangement of suitable instruments; sharp burs and excavators; a well-trained assistant.

The operator used to this rapid but at the same time thorough work will become so expert in it that every single movement of his hands will advance the operation in a mathematically precise way. He finally will get to that point of perfection that he can make solid gold work in the same short time which another man requires to do the so-called painless plastic filling. This rapid operating will exercise a sort of domination over even timid patients, and will give them the illusion that they have not been hurt, or at least very little.

Only as a great exception have we to deal with people who absolutely will not stand anything in the way of pain. In these desperate cases a great deal can be done for the better by reasonable explanation, and only old age or a weak, run-down constitution should be the excuse for superficial work.

Unfortunately, it is not given to every one to reach perfection in operating, which, after all, requires a good deal of manual skill and activity. When it comes to the treatment of difficult cases, some operators may fail, in spite of all their conscientiousness, where others may be successful. How true will appear to you just here the old Greek saying that "One of the most precious things to strive for in life is to know one's self." It will take us a good many years of experience to find out the precise measure of what we are capable and of what not. Take, for example, our most important and most responsible specialty, the conservation of teeth by gold. Every dentist will, either by born talent or by a certain routine, gradually reach the point of being able to make fairly well the average gold filling, but to master gold in every single case where it should be used—this is reserved only to those very few who will combine a marked taste for this work with ingenious skill. And since a bad gold stopping is much worse than a plastic filling, it is quite evident that the dentist who will only undertake those gold fillings which he knows by experience will have perfect results will be much more conscientious than another who will do a gold

filling with the idea in his mind, "No matter, as long as the tooth is filled with gold."

What is true concerning gold fillings is none the less so of every other branch of our art. Although we are supposed to be expert in every department of dentistry, we cannot help but have preferences for one or the other branch,—preferences which will stimulate us to excel in some specialty. There are dentists who are known as fine bridge-workers, while others will establish a reputation for treating alveolar pyorrhea; some will be experts in plate work, others, again, in regulating teeth. As a consequence, why should we not conduct dental practice as the physicians do theirs, and send our very special cases to the *confrère* whom we know is particularly expert in his specialty? Of course young practitioners in the beginning of their career, who are animated yet by what the French call *le feu sacré*, are not at all under the same conditions. The abundance of their time, their ambition to improve continually in their work, will surely help them to overcome any new difficulty; and should their proper forces be insufficient, then they will certainly put their individual pride aside and consult the experienced *confrère*, whose practical advice is never refused.

Of all the qualities for which we may have a reputation, there is nothing more noble, more unselfish, more honest, than to be a conscientious dentist. Our conscientiousness may not always find its just reward with our patients, but it never fails to win us two principal compensations,—the esteem of our *confrères* and, above all, self-respect. Let us remember, gentlemen, that, no matter what difficulties we find in foreign countries, we as representatives of American dentistry will alone by our own conscientiousness maintain this art on the height for which it is admired all over the civilized world.

INFLAMMATORY DISTURBANCES DUE TO THE PRESENCE OF A FOREIGN BODY IN WHARTON'S DUCT.

BY DR. F. J. MARTINEZ AGUIRRE,

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UNIVERSITY OF GUAYAQUIL, ECUADOR; VICE-PRESIDENT BOARD OF HEALTH, ETC.

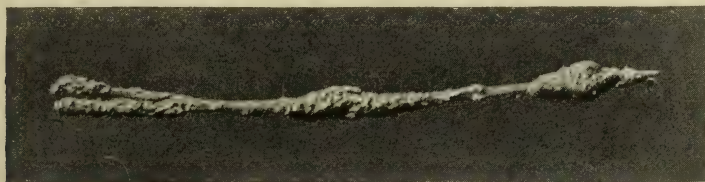
IN 1898 a patient was referred to me by one of the practicing dentists of this city with regard to a disease the cause of which he could not ascertain. The patient, a young girl of eighteen years, had been complaining for a long time of acute pain in the region of the submaxillary gland. The pain increased during mastication, and gradually became so severe that it prevented her from eating.

The submaxillary region was very much tumefied, and the skin over the gland presented a deep red coloration. As the teeth were in a perfectly healthy condition, we were somewhat in the dark as to the cause of the disturbance. The floor of the mouth was the seat of acute inflammation; the submaxillary gland was very much swollen; the mucous membrane presented a deep red coloration, and

the papilla of Wharton's duct projected about half an inch beyond the level of the surrounding tissues.

While examining the floor of the mouth, I made slight pressure upon the tissues covering the duct, when I observed that a whitish fluid was exuding through the opening of the duct. I made more pressure, and, to my great surprise, I saw that not only more fluid, but also a pointed body was coming out through the opening of the gland. I then proceeded to extract the pointed body; this I accomplished by means of an ordinary pair of pliers.

The body thus extracted was a fragment of a toothpick, which the patient had introduced accidentally and unconsciously into the duct



Fragment of toothpick extracted from Wharton's duct.
(Magnified four diameters.)

of the sublingual gland. I questioned her many times to ascertain how and when this strange accident had taken place, but, unfortunately, she could not enlighten me on the matter, as she had no recollection whatever of its occurrence.

The illustration accompanying this report shows very accurately the piece of toothpick (enlarged four times) with the calcareous deposits which had accumulated upon it during its stay in the duct.

After the removal of the cause, and after the patient had used an antiseptic mouth-wash for a few days, the inflammation and pain subsided, and since that time she has not had any further cause for complaint.

SOME PHASES OF ORAL HYGIENE.

BY LEVI C. TAYLOR, HARTFORD, CONN.

(Read before the union meeting of the District of Columbia Dental Society and the Maryland State Dental Association, May 16, 1901.)

ORAL hygiene certainly should and probably does interest more people than any subject we are accustomed to consider.

Hygiene is defined as "that part of medical science which treats of the preservation of health." In medical practice there is a wide difference of opinion as to how health shall be maintained, and the numerous methods employed give us various degrees of health; hence the title of my paper.

I once supposed that the term hygiene could be used only in its peculiar sense, and that health could apply only where seeming perfection was maintained. Upon a little broader comprehension we find that it may be applied to various degrees of health. This is very fortunate, owing to the diversity of opinions in relation to the production of a sanitary condition of the mouth.

In earlier times, when all practitioners of dentistry were simply mechanics, knowing nothing of and caring less for pathology, the dentist was fitly named (dictionary definition), "One who cleans, extracts, repairs, or fills natural teeth and inserts artificial ones." His knowledge of pathology reached the high plane of complaint by the patient, and he stood ready to be the willing servant of any who chose to order the offending member removed. Did he perform said operation to obtain a sanitary condition of the mouth? He received his fee, and was glad to cover his ignorance, instead of adopting any other method for obtaining hygienic results. It will take two generations to obliterate the false teachings of the class to which we have just referred.

The starting of a dental school here in this city, the birthplace of dentistry as a profession, by that noble and inspiring educator, Chapin A. Harris, has been leading forward to great good. The results no doubt are greater than the man himself ever expected. I am told by Dr. Lester Noble, of Springfield, Mass., that not a graduate of that time could pass the preliminary examination to enter the poorest dental school in this country to-day. Still, this was a stepping-stone to something better. Dental education has advanced along lines enabling it to assume a position as one branch of the healing art, so much desired by that venerable father, Dr. Harris. Harris's "Principles and Practice" remains a text-book in many of our dental schools to-day. Many prominent men have followed the teachings of Dr. Harris, while others have thought out and put into their practice much that is valuable, but have failed to give it to the profession except as they came in personal contact with a professional brother.

It was my good fortune to be on intimate terms with the late Dr. John M. Riggs for six years, during two of which we were associated in business. I can but regret that Dr. Riggs allowed so much of his valuable teaching to remain unreported, except as demonstrated to the few who had the pleasure of knowing him intimately. While Dr. Riggs did not pay so much attention to pulpless teeth, he would follow tartar further than any other living practitioner. Health of the mouth was his principal idea, and the reputation he made has gone broadcast the world over. In his later years he became so self-reliant that his enthusiasm took him sometimes beyond what was advisable. Starting, as he did, on the theory that all irritations are local, he believed in the surgical removal of all disorders that pertained to the oral cavity. His teachings were of a nature that allowed many imitators to make an effort, but few of those who saw him operate in cases of advanced pyorrhea seemed to feel vividly what he was doing. Neither did they perceive the fine education of the hand required to perform such an operation. Nor did they realize that the disease had extended so far, or that it had passed their ability to care for it. First, one must be able to distinguish, at the end of the instrument, by the sense of touch, five substances minutely,—namely, tooth, tartar, live bone, dead bone, and soft tissue. We can all see at a glance that such an education comes only by long and persistent effort.

Many have seen Dr. Riggs operate, and would say, "Just give me a patient who will pay for it and I will perform the operation." After a few failures, they would pronounce their efforts unsatisfactory, and either pass all future cases or attempt to cure them by therapeutic remedies. In either case, it made little difference to the patient, as the chronic and long-standing inflammation would continue; good teeth, yes, the very best teeth, would loosen and be lost. I do not believe that such cases can be cured by therapeutic treatment, and have never known of an instance where it has been done without the use of instruments. Oh yes! they all say, first remove all the tartar with an instrument, and then apply the medicine. In most cases, if the tartar has all been removed, the parts will heal within three days; but if not healed within two weeks we may be sure of one of two things: either we have not removed all the tartar, or there is necrosis of the alveolar process; more likely the former is the cause of the trouble.

Pyorrhœal trouble does not usually cause decay of the teeth, as some imagine. In fact, extended or free discharging pyorrhœa rarely if ever is found, except when there is a fine texture of tooth. The long-continued inflammation will cause absorption of the alveolus, commencing at the thin margin and working its way down until the tooth has lost its natural socket, becoming quite loose, being held in position by a cartilaginous membrane only.

While this practice is very important and necessary, it is much more to our credit to diagnose and treat cases in their incipency, and when so treated we may consider them under the head of preventive rather than curative. Dr. Riggs often remarked that if we would clean teeth well enough and as often as circumstances required, we would have *no decay*. I am a firm believer in Dr. Riggs's teachings, particularly his hygienic theories, and can testify to his faithfulness in his practice.

Along this line a new feature has been developed by Dr. D. D. Smith, of Philadelphia,—namely, prophylaxis. I know of no one who has adopted a more perfect system in caring for his patients. Two years ago I had the pleasure of being shown by Dr. Smith a number of his patients whom he had been treating for several years from the point of prophylaxis. No one who is at all earnest in his professional efforts can see what I did and not become convinced that this is a method worthy of emulation. I question whether such results as he is showing have been produced by any other man in this country. Dr. Smith gave very minute details of how he had managed each case. His so-called "betterment of tooth-structure" by systematic stimulation by friction is a new feature in the care of the mouth, which Dr. Smith claims as an original idea. The frequency of said operations is essential to obtaining such results. The general coating on the teeth, reaching well up under the gum, is of a sufficiently poisonous nature to cause a fetid secretion to emit from the gums, forming a special hotbed for bacteria which will, if the system is weak and the teeth poor,—whether the teeth be of yellow texture and soft or of the chalk white, where we get the white decay,—be fatal to all preservation until it is obliterated.

The removal of all green stains or any transparent coating that may be found on the teeth is an operation demanding skill acquired by a much higher education of the hand than the simple act of filling cavities, even when the extension equals the radical dimensions advocated by some of our Western dental jewelers.

This work must be done exclusively by hand. If we polish with our stick and pumice that portion under the gum which the engine will not, we will then find the face of the tooth has been so completely finished that there will be nothing left for the engine to do. But first polishing the face of the tooth with the engine takes away the guide so much needed to distinguish just how fast we are getting along. The partly polished surface will confuse that nice distinction of touch so much needed to know just when that portion of coating transparent to the eye but a great irritant to the gum-tissue has all been removed.

Many of us seem to feel that filling teeth is the one important feature of dentistry. It is important indeed, but as soon as all cavities are filled we are not doing justice to our patients to dismiss them for time not mentioned. It is our plain duty, as soon as the mouth is in perfect order, not only to impress upon our patient that he must care for his own teeth daily, but also that he must have them cleaned thoroughly each month in a professional way. I sometimes remark to those patients who we know are under the necessity of counting the cost, that the nice thing is to have them attended to each month; a little more economical is every two months, and extreme economy every three months. I do not believe it is economy for any one to go longer than three months without having the teeth polished and well massaged. The tooth-structure will very materially improve under such treatment, and both patient and dentist will feel much pleased at the results that can be obtained by such a systematic course. This applies to those teeth which are fair to good, while those of a specially poor structure need positively to receive treatment each month. We also owe the above to ourselves to maintain our own reputation for good work, as such work will last many times longer.

There is another feature connected with such businesslike methods,—*i.e.*, it will do away with so much of this changing of dentists, and be the strongest protection that can be thrown around our reputation.

Where there is a tendency to recession of the gums, as on some kinds of front teeth, usually canines and laterals, if cared for properly by frequent polishing and massaging, not only are teeth retained, but the gum will change from the whipcord edge to a thin edge, hugging the tooth closely, with sufficient restriction to come nearly or quite to its normal position,—especially so in young patients.

One of the great causes of failure in the proper caring for the mouth is want of a thorough, careful observation and ability to diagnose all the little warnings nature throws out for us to observe. We notice very few practitioners observe the little striations plainly apparent in the gums, starting a fourth-inch below or above the

gum-margin, and usually making a bright red streak running parallel with the teeth. Said striation always has an origin, just under the gum-margin, from an irritating cause,—it may be a slight nodule or may come from a coating, but the cause can and should be found.

Another form of inflammation sometimes is found to be a heavy, dark redness commencing about one-fourth of an inch from the gum-margin and extending well into the lip. This latter description is not always easily diagnosed or prognosed. It will usually yield to the treatment we have before described, provided it is followed with thoroughness and frequency. When it fails to disappear with said treatment, we may be pretty well convinced that there is a local crowding of the arch which we have not comprehended, which quite frequently will develop into acute facial neuralgia, with darting pains at times passing to the temples, when we may be quite sure that the teeth are becoming exostosed. The destruction of the nerve will be necessary if it has not already been choked off at the apex, and sometimes a full drill opening will be advisable, as the tooth can be much benefited and usually reduced to comfort, for many years at least, by frequent application of a hot instrument forced up the opening.

INSTRUMENT-CASE STERILIZATION—INSTRUMENT STERILIZATION —STOMATIC STERILIZATION: HOW, WHEN, AND WHY EACH IN ITS TURN SHOULD BE EMPLOYED.

BY FRANK W. LOW, BUFFALO, N. Y.

(Read before the Seventh District Dental Society of the State of New York, April 9, 1901.)

MR. PRESIDENT AND GENTLEMEN: In an experience of something more than twenty-three years of practice, I have extracted many teeth. It has never come to my knowledge if serious results, such as extensive loss of tissue or malignant growth or blood-poisoning, have followed my operations, and yet, from the standpoint that a surgeon would approach his work, until very recently I have never performed the operation as it should be done.

This statement preludes and leads up to the consideration of *stomatic* sterilization. When, why, and how should it in its turn be employed?

"In the human mouth there is a certain group of organisms more or less characteristic of it . . . many of which have not been successfully cultivated."* Of this stomatic group, we know that *Staphylococcus pyogenes aureus*, *Staphylococcus pyogenes albus*, and *Streptococcus* are infective; besides which there are many others not so often found, but quite as much to be dreaded. "As dentists," says Dr. Black, "we must take into consideration that the

*"A Manual of Bacteriology," by Herbert U. Williams, M.D., Professor of Pathology and Bacteriology, Medical Department, University of Buffalo, Blakiston's Sons & Co., Philadelphia.

pyogenic bacteria are generally present in the oral cavity, and endanger every wound which we make in it."

"The view entertained by many dentists that human saliva possesses antiseptic properties seems to me to be unfounded," says Professor Miller. To the writer it seems a veritable paradox, this view so generally prevalent in our profession, that while it is extremely dangerous to transplant bacteria from the mouth of another, especially any of the virulent "pathogenes," that the gum of our patients is immune to the very same germs when implanted from about the teeth in the patient's own oral cavity. I have been unable to learn upon what authority it has been adopted, but, if a case is reported, septicemia following extraction is unfailingly attributed to an unclean instrument or hypodermic needle, but *never* to unclean secretions about the neck of the tooth operated on.

The question why, preceding all dental operations, stomatic sterilization should be employed is answered by the preceding quotations from Black and Miller, and the subject is still more exhaustively written up in the chapter devoted to antiseptics by James Truman in the new edition of Kirk's "American Text-book of Operative Dentistry." But through all standard works, from Taft and Harris down to Professor Kirk (excepting only this very last edition), your essayist has sought in vain for instructions as to how a tooth should be made ready for the grasp of the forceps so that pathogenic organisms might not be jammed down into the wounded and more or less comminuted tissues.

The idea of spraying the entire oral cavity with some pleasant stimulant, astringent antiseptic at the very outset of every operation was first suggested to my mind by my *confrère* Dr. Louis Meisberger, of the city of Buffalo, at one of our city dental society meetings, something over a year ago. I have found some patients who demur to what appears to them to be an over-nice prophylactic precaution; resentment because of the implied lack of confidence in their habits of cleanliness has invariably proven to be the cause. Fearing that others might suffer in silence and go away disgruntled has led to my partial abandonment of the procedure, but I am still convinced that Dr. Meisberger's recommendation is indeed the "proper caper," and when I write *my* American text-book his idea shall be incorporated with due acknowledgments. But to his suggestion for general stomatic sterilization I am going to add, in even more emphatic language than does Dr. Truman, that no thoughtful operator will permit himself to seize upon a tooth until first it has been bathed; nay, cleaned with swab most vigorously all about the gingival border of the gum surrounding it, and this with the most concentrated antiseptic that the tissues of the oral cavity can tolerate; nor will he ever stab with hypodermic needle until some such precautions have first been taken.

Instrument Sterilization.—Under this head, should I quote Chapter IV of the "American Text-book of Operative Dentistry" in its entirety, it would to me seem warrantable, since it is the *first* effort worthy of the name to place before the student body of our profession a systematic and comprehensive consideration of "antiseptics in dentistry," so far as they relate to instrument sterilization.

Professor Truman begins his chapter with this statement: "The importance of antiseptics in dental operations has not been recognized as fully as the subject would seem to warrant." Gentlemen, let me urge on every one of you that you find or make an early opportunity to study and most thoroughly digest the subject-matter of Professor Truman's treatise. I deem it altogether the most important and timely chapter in Professor Kirk's new work. A few, and necessarily but very brief, quotations follow: "The difficulties attending antiseptics in dentistry far exceed those in other branches of surgery." . . . "While this is true, it does not follow that every effort should not be made to approach absolute surgical cleanliness." . . . "The usual methods to accomplish this, while valuable to a limited extent, are by no means equal to what could readily be secured without consuming much time or patience." . . . "Excavators ordinarily receive the most attention, and yet, when their use is considered, they possibly require the least." . . . "Hand-pieces of the various kinds in use are probably the most difficult to keep thoroughly clean." . . . "Frequent taking apart and boiling are essential, and should not be omitted." . . . "The lancet is an instrument demanding especial care, as it may become a dangerous source of infection. Before it is used the adjacent portions of the gum should be washed with an antiseptic. The forceps employed in extraction should be so constructed as to render the blades readily separable at the joint, and they should be boiled in a water and soda solution for an hour. The recorded cases of infection from these instruments render this care imperative in all instances." . . . "Before the forceps are applied to a tooth for the purpose of extraction, the parts surrounding the tooth should be well washed with an antiseptic solution. After the extraction, the socket should be syringed with sterilized water, followed by some powerful disinfectant."

Of the sterilization of instruments by the process of formaldehyd fumigation, after quoting at some length concerning experiments made by Dr. Elmer G. Horton in Philadelphia and those made by Dr. Thomas B. Carpenter and myself in Buffalo, Dr. Truman concludes: "While it is not difficult for the average dentist to use formaldehyd as a disinfectant, it will probably be considered a useless expenditure of time, and therefore boiling in water and soda for at least twenty minutes seems the more feasible and equally certain in the results."

Urging the employment of two complete sets of instruments, one to be sterilized by boiling while the other is being used, Dr. Truman recommends that "at the close of the day all instruments used should be thoroughly boiled, then dried on an aseptic napkin and placed in the case," adding that "the possibility of infection from the latter must not be overlooked." With this idea in view, he recommends that "the first and second set therefore, used the next day for the first time, should be either boiled again or each instrument dipped into an antiseptic fluid." For this purpose he prefers "a strong solution of hydronaphthol (six grains to the ounce of alcohol) to the carbolic acid solution ordinarily used. With this

care," concludes the doctor, "all danger of infection can be removed* and the dentist relieved of all legal responsibility."

Regarding the reason why, I surely need add nothing to what here has been so wisely chosen by so eminent an authority; but, in regard to the most fitting time and also as to the most efficient and convenient means of instrument sterilization, I shall make bold, even at the risk of seeming too presumptuous, to outline procedures considerably at variance with what seem to be the methods most approved and practices established by continuous usage in the life of one of our most careful, most conservative, and yet withal most painstaking and progressive American dental practitioners.

After use, as they are gathered off my operating table, the first step looking toward instrument sterilization is sorting. A certain class of implements and appliances go back into the operating case without any attempt whatever to sterilize. Of this class my little rubber-bulbed chip-blower, for instance, will serve as an example. Several other appliances, for various reasons, are put away in their respective places without attempting sterilization.

After this weeding out, all the other *used* instruments are taken by my assistant into the dental laboratory, where they are again assorted. Any smeared with blood or pus are scrubbed thoroughly with a soaped brush under a stream of water at nearly or quite boiling temperature,—coming as it does from an "instantaneous water-heater." Engine burs, excavators, cement spatulas, and scalers are then subjected to a vigorous polishing on a rapidly revolving wire brush wheel, after which they are again scrubbed, dipped into a formaldehyd solution, wiped dry, and returned to the case.

Of course I am aware, to quote a final paragraph in Dr. Truman's treatise, that "dipping" in even a formaldehyd solution is not sterilization, but when it is considered that the instant they come in contact with the next carious tooth they are again infected, it seems to matter little. A careful operator seldom wounds tissue capable of infection with any of these other than the scalers, but if he should do so, before proceeding farther with the operation proper he will stop to treat the wound with antiseptic dressing. In the use of scalers only we have to reckon constantly with the problem of infection. It is with these instruments, as much as with the gum-lance or the forceps, that the best means possible must always be employed to effect complete sterilization, and that, too, during as well as immediately preceding their use in operation. Brisk boiling for fully twenty minutes is efficient; not even extracting forceps need longer treatment.

Only one other method is known to science to-day that will effect *truly complete sterilization*, and it seems to me really worth while to

*The writer does not agree with Dr. Truman that all danger of case infection can be removed if the first and second set of instruments are dipped in however strong a solution of hydronaphthol; my objection being not so much on account of the medicament chosen as because of the fact that the instrument does not remain in contact with the germicide for *sufficient length of time* to insure sterilization,—see conclusion numbered 1 of Dr. Truman's final summing up of the subject of instrument sterilization, "American Text-book of Operative Dentistry," 2d ed., p. 171.

recount this in minutest detail, in the hope of making converts, since the method is more easily accomplished and doubly as expeditious.

When I know that my patient is coming for a scaling operation, previous to her arrival my scalers have been prepared. If not, the patient is kept waiting for ten minutes, and I have never found one yet who was not willing. During this operation my assistant is always present. Having occasion to change instruments, the one I have been using is laid down with the point overhanging the edge of the operating table. At this signal my assistant takes off the cover of the sterilizer, and when I have selected the instrument wanted she wipes the one laid down and returns it to the formaldehyd gas chamber.

The time is coming, gentlemen, within the experience of many who are here present, when to skillfully clean and treat will be recognized as paramount to every and all other dental operations.

Among that class of people who pretend to take any systematic care of them, more teeth are sacrificed to-day in consequence of various causes that result in exfoliation than because of the combined malaise of all other dental complications.

Consideration of the sterilization of rubber dam, dam clamps, steel separators, and the like comes more naturally under discussion with instrument-case sterilization. The forceps and the gum-lance are alone like the scaling instruments,—properly cared for only when confined in formaldehyd gas chamber for full ten minutes immediately preceding use in every operation.

Instrument-Case Sterilization.—Judged by their usual practice, it appears to be the opinion of dentists generally that the proper time to sterilize their instruments is *after* they have been used, and then they are put away in the operating case, where they are supposed to be ready for use in the next operation without further attention.

This to the writer seems a grave error, and yet one can never tell, of a necessarily large number of instruments and appliances, which may be the one called next into requisition. To keep one's whole outfit constantly immersed in a truly antiseptic solution is utterly out of the question, and the only other alternative is instrument-case sterilization.

Following is the list of varieties of cultures discovered by Dr. Carpenter upon instruments taken from their various receptacles in the instrument cases of twenty-four of my *confrères* during the spring and summer of 1899. Nearly all were treated to antiseptic measures that are generally accredited as adequate. After being so treated they were immediately put away. It was within the dental cabinet, then, that they developed: *Sarcina aurantia*, *Staphylococci* and *Streptococci*, *Bacillus proteus*, and an actively motile bacillus. In one tube a pure culture of some form of *Leptotricheæ*. In another green mold. In several the *Sarcina lutea*. In still others the various forms known as myxomycetes. While many of the tubes upon final examination emitted no distinguishable odor, others there were that made up with their stench for those that emitted none. The only test that proved entirely sterile was one in which twenty miscellaneous instruments were, one after the other,

immersed in a single tube after they had been confined all night in a Harvard scroll-top cabinet having a formaldehyd lamp in it.

In view of such findings as these, together with such as I am now enabled, in addition, to report, the imperative necessity for instrument-case sterilization becomes at once apparent.

That there are any serious objections to its employment I have been unable to discover. Indeed, an exhaustive series of experiments, embracing about one hundred cultures, which I have very recently completed, demonstrates conclusively, to my perhaps somewhat biased judgment, that the process is both practicable and desirable, while it is in no sense difficult of accomplishment.

These experiments show, as did the series of 1899, that instruments are liable to prove *not* free from contamination, though they may have been dipped or washed before they were put away in any of the so-called reliable antiseptic solutions; and, though I have not yet tried a complete series regarding the efficiency of twenty minutes' boiling, I am confident, from the very nature of things, that identical results are justly to be anticipated.

You notice that Professor Truman quotes (in his chapter on "Antiseptics in Dentistry") concerning facts which I frankly stated in my former paper: "Every set except the one where the whole case was fumigated over night produced some cultures, but not one developed a culture of pathogenic organisms." But, gentlemen, I maintain, without the slightest fear of successful controversion, that their immunity was purely and solely a matter of good fortune.

The proportion of non-pathogenes to pathogenes is very large, so far as science is yet enabled to weed them out, but danger from case contamination, especially in a case that never is subjected to proper fumigation from month's end to year's end, is very great,—as great as was the danger of that man who having wheedled out the seven evil spirits and coming again into his garnished and clean-swept residence found things too clean, too antiseptic, for his liking (probably because it smelled of formaldehyd fumigation), so then he fared forth and gathered in seven other evil spirits more evil than the first; and Matthew tells us (or rather his Master it was told *him*) "the last state of that man is worse than the first."

Before closing, I wish to have read to you the comments of Dr. Hatch in his report of 1900 to the State Dental Society. Dr. Hatch was chairman and read the report of the Committee on Dental Practice: "The subject of disinfection of instruments, etc., has rightly received much attention; the paper by Dr. Low, of Buffalo, being especially interesting, describing as it does a method of sterilizing the contents of the whole cabinet by the use of formaldehyd gas. Have we not been inconsistent in laboring to clean burs, excavators, etc., while leaving uncleaned our hand-pieces, clamp forceps, face-pieces, etc.? Surely the hand-piece must be a "microby" thing before night. Dr. Low reports bacteriological tests of instruments taken from the operating table of representative dentists after having been cleaned (?). He gives the startling results under the headings of "Dr. A.," "Dr. B.," etc. It gives us the horrors to think of the consternation that would have resulted if the facts had

been gathered by officers of the state and published in the morning papers, giving the full name and address, coupled with a possible fine and imprisonment. Dr. Miller warned us of this some time ago, and it will *surely* come if we do not mend our ways."

In concluding, I recapitulate on the "why, when, and how" of instrument-case sterilization, because this phase of my subject needs more thorough digestion,—being somewhat new. Why? Because pathogenic organisms may otherwise contaminate our instruments though in other respects we take the greatest care of them.

Statistics at best are tedious reading, and to undertake to enumerate the minutiae of detailed experience I am sure would bore you. I have recently conducted twelve distinct series of experiments. I shall be glad to explain to any one who may have sufficient interest the object of each, and their consequent conclusions. But as all roads lead to Rome, so these all have led to finding that case sterilization was really and truly essential.

Take these two tubes, for instance: Cultures were taken from the very same instruments, out of the very same tray of the very same instrument case; one set before, one after case fumigation. Can you not guess which culture was inoculated with instruments from the case before it had been fumigated?*

These next two tubes were taken from my own case. F 1 contains a fungus obtained by immersing the tail end of this file before the case had been fumigated with formaldehyd. Inoculation with the same file since the case was fumigated has developed no cultures, though the experiment has been repeatedly tried for nine consecutive days since the lamp was last operated in it. That is, the case was last fumigated on February 23d, after which inoculation took place every night from March 4th to March 9th, inclusive.

D 2 contains a culture from a matrix that was kept shut up in a little glass box inside of one of my drawers. Being so shut in accounts for the fact that, while all *exposed* instruments after fumigation proved sterile, this little matrix (because the formaldehyd gas could not penetrate through the glass or leather) still continued to harbor living organisms.

Tubes inoculated out of Dr. Butler's case and out of Dr. Beach's proved sterile before as well as after fumigation, but the instruments were taken from only a single drawer.

Dr. Beach, I know, is in the habit of fumigating frequently with formaldehyd gas generally throughout his office. How often Dr. Butler does the same I am not so certain.† It is quite possible that this habit of general fumigation may account for the sterility of both my neighbors' instruments before as well as after I had given them special treatment.

One other thing militates against winter cultures. All things, especially in offices where dry-heat furnaces are used, are dried out

*It was only necessary to hold the tubes shown toward the window light; the turbidity of the one that was not sterile being easily perceptible from any portion of the room.

†These gentlemen are neighbors of the essayist, having offices in the same building, in Buffalo, N. Y.

to that degree that inoculation from bacteria-laden air is not so certain. But, winter or summer, spring or fall, I throw down this gauntlet to the dental world: Case fumigation with formaldehyd gas has surely got to come, and when it comes it will stay.

The daily "how" and "when" of this special sterilization I was permitted to demonstrate upon the operating case of our genial host, Dr. C. E. Wettlaufer, at a recent meeting of the Buffalo City Dental Association, after the reading of a paper of which this is in the main a repetition. At the conclusion of that meeting I took at random four instruments from one drawer of his cabinet and five from another, and, having burned off or flashed cotton plug and mouth of culture-tube, I immersed the instruments in beef-tea culture-media. Subsequently it was incubated and examined by Mr. William H. Rogers, a competent *attaché* of the state pathological laboratory (Buffalo University) for the investigation of cancer. When he returned the culture-tube it was marked as containing germs of some sort, though time was not expended to determine classification. You can yourselves most readily observe that the beef-tea is considerably clouded.

Following this experiment, we were entertained at luncheon, during which time—probably three-quarters of an hour—a small formaldehyd generator was shut up in one of the lower drawers of the dental cabinet. Then a second tube was cultured from the same number of instruments, from the selfsame drawers, and was incubated and examined the same as the other. Mr. Rogers's report was, and you can see, that this beef-tea is sterile.

If this were but the finding of a single experiment it might prove nothing. It was, however, intended as a public demonstration of the fairness of experiments several times before repeated, which in each and all cases had resulted identically.

My journey here and this presentation has been made in the hope that some of you may be induced to still further investigate the subject of instrument-case sterilization. It ought to be done by others than myself now, in order to eliminate the possibility of the personal equation.

The *modus operandi* of instrument-case sterilization is very simple, it being only necessary to provide some sort of ventilation connecting the various portions of the dental instrument cabinet; having done which, a formaldehyd generator is set in operation and placed in the most convenient drawer or cupboard. The time required to sterilize any given space depends of course entirely upon its size; a most convenient method, and the one I pursue, being to fill to about one-fourth its full capacity and then leave the little formaldehyd generator to exhaust itself upon my cabinet after office hours or when I have gone for the night. In other words, one hour's fumigation is found to be most ample, even in dental cabinets of the very largest size.

Gentlemen, I thank you for your most patient and courteous attention to what, from the very nature of things, could not be made otherwise than a very long paper.

THE NAVY'S NEED OF THE SERVICE OF DENTAL SURGEONS.

BY WMS. DONNALLY, WASHINGTON, D. C.

(Read before the Pennsylvania State Dental Society, July 9, 1901.)

THE number now authorized by law for the naval service is about 32,800, classed as follows: Commissioned officers, 1207; warrant officers, 378; marine officers, 212; marines, enlisted, 6000; blue-jackets, enlisted, 25,000. Of the last, 5000 are apprentices. The number actually employed at present is probably 5000 short of the full number authorized, but the increasing importance of this branch of the military service continues in time of peace as well as of war. It is therefore probable that recruiting will be continued as long as this country grows in greatness as a world-power, or at least until its naval strength exceeds that of any other nation.

The officer's and enlisted man's need of medical service for avoidable and unavoidable diseases and injuries has always been recognized, and for both humane and economic reasons the government provides for a medical service as easily available, efficient, and competent as the most opulent citizen can command. The members of the medical corps are required to be educated in every branch of the healing art taught by the best medical colleges of the country; but, as for sixty years that branch known as dental surgery has been omitted by the medical colleges and has been assumed and developed by the dental colleges, no special knowledge of dental and oral surgery is required. The government recognizes the necessity of good teeth to promote the health, comfort, longevity, and efficiency of its fighting men, and makes a good condition of the teeth an essential to entrance to any part of its military service. The naval cadet, under an environment both before and after his entrance favorable to the needful care of the teeth, is very properly furnished dental service free for the four years' course at the Naval Academy. Later his salary, opportunities, and habits contribute to the preservation of his teeth, and I have yet to learn of one being hindered from promotion or from continuance in the service on account of the loss or of defects of these important organs. But you will find it different if you follow the history of the boys who enter through the naval training-schools or by enlistment. No matter at what cost to the government his training may have been, nor how urgent or immediate the need of his valuable experience may be, he cannot re-enlist unless he has voluntarily and with meager means combated the inevitable tendency to the impairment of the functions of the teeth and the consequent injury to the general health, because every re-enlistment calls for a good physical condition, including teeth, sufficient for the exigencies of the service.

The policy of the government, which is in almost every way liberal to those who give up the advantages of civil life for the military service, is in this instance a lamentable departure from the humane and economic principles which control the recommendations of the heads of departments and the legislation of Congress. This is a pretty strong statement, but justified if the facts support it. Let us briefly review the facts.

Congress provides at great expense for the education and training of 300 cadets and 5000 blue-jacket apprentices, taking them at the tender age of fourteen to sixteen years, becoming the guardian of their health, morals, and general welfare, and giving them an occupation which soon materially unfits them for success in civil life.

In the case of the cadet, favored in other respects, the propriety and expediency of providing the professional service of a dentist is recognized. In the case of the less favored class, whose need of such service is greater, the expense of four years' preparation for a military vocation is borne by the government, and, in addition, an allowance of from nine to twenty-one dollars per month is made. While there are no statistics of this class from which we can quote, we all know that dental disorders, local and systemic, are universal and unavoidable; that their cure is never spontaneous; that in the military service, more than elsewhere, neglect or inadequate treatment involves loss of service, hospital expense, and often pensionable disabilities, and that only the competent dentist can render the preventive, curative, and prosthetic aid required by nature to maintain the normal life-processes.

The surgeon-general of the navy is, *ex-officio*, the guardian of the physical well-being of 27,000 men and boys, and his recommendation to Congress for suitable legislation in the premises would insure the favorable action of Congress. The Navy Department, by regulations and recommendations to Congress, shapes the details of legislation, such as the term of enlistment, the physical condition in enlistment or re-enlistment, promotions, assignments, etc. The boys are placed in positions where the conditions inevitably lead to disease and suffering, and inadequate treatment to loss of the teeth, or, what is worse, a condition of the teeth that impairs their function, and thereby causes gastric, intestinal, and other disabling disorders.

The humane aspect of the subject presents preventable suffering, impairment of health, unequal opportunity for advancement in the service, and loss of occupation, with concomitant aimlessness of life,—all of which is in large measure avoidable through the employment of the best service available.

In this country, rich in material wealth, with a navy whose achievements are the pride and glory of its people, is there a public servant who would wish to perpetuate a distinction in the government's provision for their health and physical comfort between the cadet and "the man behind the gun," whom God has created equal and with the same capacity for suffering and the same physical demands for remedial aid? I believe there is not, and the mind of Congress is indicated by the discontinuance of a similar distinction which existed until recently in the army.

But if there were no promptings of sentiment and humanity, there is yet another aspect of the subject that appeals to the business judgment of all who have to do with the economic interests of the government. In every matter relating to the efficiency and effectiveness of any part of the naval service, whether pertaining to the construction or repair of ships, to yards and docks, engineering,

ordnance, supplies and accounts, or to medicine and surgery, the policy is, as it should be, to employ the highest order of expert skill for both conception and execution. Hence no man is supposed to be assigned to duties, even in minor details, for which he has not special education and training at least equal to corresponding duties in civil life. If this principle applies generally, why not to dentistry in the Bureau of Medicine and Surgery, where no special knowledge or equipment for the treatment of dental disorders is required? It is not possible that any man in either bureau could be quite equal to every detail of the work of his department. It is to the credit of every bureau that the chief officers ask for expert assistance for such work as they are not specially trained to do. The medical treatment of a developed dental disorder or systemic disorder of dental origin may be effective in ameliorating suffering, but it cannot be adequate to the timely dental treatment which prevents, much more economically, the development of the disorder; so in such cases economy in hospital and transportation expense may be effected, and in not a few cases there may be prevented the total disability which renders not only idle or valueless the investment made in years of training, but increases an already enormous pension list.

That the government attempts to pay damages for the loss of teeth may be regarded as liberal, but it should certainly be regarded as sounder business economy to apply "the ounce of prevention" principle rather than the inadequate "pound of cure" remedy where health and efficiency are involved. The practice of the Pension Office in this respect was stated for the information of the Military Affairs Committee of the Senate and House as follows: "Loss of teeth from traumatism or from scurvy constitutes of itself a pensionable disability. Diseases of mouth (gums) and loss of teeth are accepted and pensioned as results of scurvy."

It is exceedingly unfortunate that data are wanting for definite estimates of cost in medical, hospital, pension, and other expenses involved in the neglect of timely and suitable care of the mouth and teeth, but it must be apparent to every one that in this class of cases, as in others, timely and suitable treatment is much more effective and economical even when the matter of pension is not a factor. It is safe to venture the opinion that the Pension Office expense alone of investigating and passing on the validity of a claim for loss of teeth would have paid the cost of preventive treatment in almost every such case. The cost to the government for dental service for the cadets is less than six dollars per annum for each cadet. For larger bodies of men and boys, equally as efficient service may be conducted at half that amount.

Another aspect of the subject relates to the means of making the service equally available, and at the same time meeting such difficulties as are presented by overcrowded vessels and the unfavorable conditions aboard ship for rendering ordinary dental service.

It may be quite impossible to give to every one in the naval service at all times an equal opportunity, but in this connection two facts are worthy of note: First, that the more urgent need of dental service is the more easily provided for,—namely, that of the

young wards of the government who are entering the service through the training-schools; second, that the average number "at sea" is comparatively small, and it is quite certain that suitable attention while ashore would suffice to materially decrease the need of dental service at sea.

Since a futile effort just before the civil war, the Navy Department has not sought to provide dental service, though appreciating the need to such an extent as to feel justified in occasionally resorting to the irregular means of giving a petty office to some impecunious dentist with the understanding that he should be detailed to render dental service. Some of you may not feel complimented that such expressions of appreciation of the value of dentistry are not accompanied with a commensurate recognition of the status of the dental profession, but you must bear in mind that some special need creates the demand for extraordinary means, while the regular and proper method must have its origin in the recommendation of the Surgeon-General or the Secretary of the Navy, and is too slow a process of meeting such a special call as was made from the island of Guam.

The attitude of the dental profession should, in my opinion, be determined by that of the Surgeon-General, inasmuch as the responsibility rests almost exclusively with him as the head of the Medical Bureau, and no legislation should be attempted except by him, or at least with his approval. As to the status that should be accorded, that is a matter also for either previous agreement or the decision of the Committees of Congress on Naval Affairs, but it is safe to assume that the present incumbent of that important office will be found willing to accord a status commensurate with the professional education and attainments necessary to meet the requirements of the service, especially since he knows from experience the difficulties and delays in securing the deserved improvement in the status of his own medical officers and how important the matter of status is in attracting to the service the more desirable class of professional men.

The status of the dental surgeon need not affect that of the medical officers, and their separate fields should be as distinct as in the well-established lines of civil practice.

There is one pertinent duty of our profession to which every worthy member should give more attention, and that is the dissemination of information relative to the value to the general health of good teeth and of oral hygiene in its broader sense. The constant presence of a variety of pathogenic germs in the neglected mouth and their ready entrance thence to the system, even through the cavities of decaying teeth, and the many cases of pus from the diseased tissues about the teeth, should be sufficient to impress any one with the fact that the general health is endangered in every such case.

We are not limited to our own or other specialists' views, since so many leading medical authorities have formed and expressed decided views as a result of experience in general practice. From hundreds of such in my possession, about one hundred and fifty of which were recently written by the medical corps of the army, I quote a few samples:

LIEUT.-COL. WILLIAM HILL CLIMO, M.D., Brigade Surgeon, in September number of the *United Service Magazine*, London, in an exhaustive article on the personal hygiene of the soldier, says: "It used to be my custom to examine the mouths of all young soldiers on joining their regiments. The want of care shown by them was phenomenal. Between the teeth, often unsound, were lodged broken pieces of food. In many instances I often found it to amount to twenty per cent.; the gums were soft and spongy, and bled on the slightest pressure. What a constitutional state did this represent to resist disease, and what a nest for the germs of zymotic diseases to rest and develop in! It will, perhaps, be thought that these are trifling matters. Such is not the case. I vouch for their prime importance. The importance of sound teeth to the soldier is very rightly insisted on, though no doubt it is not so much so as in former times, when, because of long voyages, or protracted campaigns, hard biscuit formed the staple food. Still there can be no doubt, to preserve the health and to ward off many forms of sickness, a good set of teeth is no mean armament. It has often occurred to me, this being so, why it has been that, while the state of the teeth on enlistment is a matter of stringent regulation, yet afterwards it is practically neglected. The army medical staff, by their present training, are not competent to deal with it. In every garrison, if not certainly in every district, there ought to be appointed a duly qualified dentist, and for duty with troops."

W. O. OWEN, Major and Surgeon U. S. Army: "For seven years I have been giving especial attention to the diseases of the mouth and teeth because of their influence on the general health. During the time in which I was in charge of Corregidor Hospital about three hundred soldiers, more or less disabled by dental disorders, were under treatment. I recall one case in particular, a diarrheal trouble of several months' standing, which resisted treatment until placed under the care of a dentist, whose treatment, directed to the mouth alone, effected a cure and the restoration of the soldier to active duty in two weeks. There were fifteen or twenty similar cases, known as pyorrhea of the sockets of the teeth, with pus bathing the teeth, mixing with food, and entering therewith the alimentary tract. Neglected, such cases cause a pensionable disability."

OLIN F. HARVEY, M.D., Surgeon, Ninth Pennsylvania: "Good teeth have a great influence in keeping the stomach healthy, and a good stomach helps to make a good soldier. I think all physicians are agreed upon this, that many diseases of the alimentary tract are primarily due to a defective dental organism."

PROF. THOS. S. LATIMER, M.D., College of Physicians and Surgeons: "There can be no doubt that many soldiers were as effectually disabled by toothache, facial neuralgia and other ailments, oral and gastric, due to lack of proper treatment, as from any other form of sickness, or from gunshot wounds."

"Precisely as the exhaustion, exposure, and unsuitability of food, incident to an active campaign is the need of good masticatory organs. These being neglected or improperly treated scurvy, dyspepsia, dysentery, and diarrhea are prone to ensue."

"Nor is there any disability from any injury, or sickness even where not directly connected with imperfect mastication, that is not more protracted when mouth complications exist."

"I need scarcely say that no ailments occasion greater suffering than toothache and neuralgia arising from decayed teeth. Nor are any more susceptible of prompt and complete relief under proper management. I may add that the regimental surgeon is incompetent to render the service required."

THOMAS OPIE, M.D.: "It has been my lot while an army surgeon to observe great suffering and sometimes deformity in this branch of medicine. At the same time, it was painful to realize that no scientific nor even special provision was made for such cases. That the health, strength, longevity, and courage of the soldier depend in large measure upon his powers of mastication cannot be questioned. The dental specialist is best equipped for dealing with these lesions of the teeth, and surely the man who fights his country's battles has the right to claim the comfort and health which accrues from their being in perfect order."

CORRESPONDENCE.

A PLEA FOR MORE EXTENDED KNOWLEDGE OF ANESTHETICS
AND RELATED SUBJECTS.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—There are many lessons to be learned from the medical journals of the day, which publish various articles upon anesthesia and comment on an occasional death after surgical operations. But there has as yet been but little attempt to provide for the more complete education of the profession of the future. Dental students frequently pass their first year of study with medical students, preparing themselves in anatomy, physiology, histology, chemistry, etc., but immediately upon entering the studies of dentistry proper they see but little clinical medicine, and as a rule have but little experience in any but dental cases.

In view of the fact that anesthesia is a very important part of a dentist's work, and that he is likely to be called upon to meet the emergencies of cardiac and respiratory diseases, it would seem fitting to offer a few suggestions regarding the more complete education of the dental student.

Dentists are called upon to administer anesthetics much more frequently than medical practitioners, unless the latter are especially engaged in surgery; and in the administration of nitrous oxid they are certainly the more expert. In fact, nitrous oxid is just now being adopted by the more progressive anesthetists, but in the use of ether and chloroform the surgeons can justly claim a larger experience.

With regard to diseases of the heart, every dentist should be able to detect valvular lesions and to describe and observe murmurs. This knowledge can only be attained by repeated observation, and to this end all dental students should have clinical instruction in their senior year. Clinical instruction, because that is the only way to teach these things. In their senior year, because they should go out to their professional work with the knowledge of this important condition fresh in their memories. Each student should have carefully observed at least twenty-five cases of valvular heart disease, and be examined upon the correctness of his observation by a test with patients.

Together with the auscultation of the chest for heart murmurs goes the observation of *râles*, the detection of phthisical conditions, consolidation, pleurisy, and the various other features of pulmonary disease. This will assist him in the choice of an anesthetic and in the treatment of complications that may arise. It is not the best practice to give ether to a patient suffering from chronic bronchitis, nor chloroform should there be advanced mitral insufficiency.

With regard to renal diseases, the student should have the oppor-

unity to see enough cases of kidney disease to stamp forever upon his mind the clinical importance of edema of the ankles, wrists, and eyelids, dropsy of the abdomen, the odor of acetone in the breath; and he should be familiar with the common methods of the examination of the urine for sugar and albumin. It is also important to know the clinical significance of a low percentage of urea and the simple test for the condition. It is not too much to hope that in the near future each anesthetization will be preceded by an examination of the urine for albumin and urea. One or two questions throw out the likelihood of diabetes mellitus, and a chemical examination takes but a very few minutes.

It is necessary, too, that instruction should embody a realization of the fact that there is a class of cases to which an anesthetic should not be given except by the most skillful and experienced expert, and then only on the patient's own responsibility. In patients with partial paralysis, endocarditis, renal insufficiency, toxemia,—and these diseases are not uncommon,—the anesthetic should be in the most skillful hands or the operation refused.

These things can be readily taught in any hospital, and any instructor who takes the proper interest in his students could easily select a few marked cases to demonstrate to them.

As to actual experience before graduation, dental students should have the experience of at least a dozen cases of anesthetization; not alone the witnessing of the operation, but the actual administration of the anesthetic. It is not often that in the course of operative dentistry there is an emergency where human life is at stake, but in the use of anesthetics such may occur at any time, and the student or dentist should be always prepared and ready.

Examining boards, whether state or collegiate, should satisfy themselves that dentists are familiar with the best known methods of resuscitation, the doses of drugs to be used hypodermically, the process of artificial respiration, the use of Faradism as a respiratory stimulant, and the more recent applications of oxygen in combination with various anesthetics.

This is not written in a spirit of captious criticism, but rather as a plea that the more complete study of anesthetization may not be overlooked in the progressive spirit that characterizes the dental profession. Is not a working knowledge of anesthetics fully as important as histology,—a subject without which no dentist's education would be complete, but which is rarely used in post-graduate life except by a few? The medical journals are clamoring for more instruction in the use of anesthetics in the medical schools; should we not urge upon dental colleges the realization of an equal or even greater need?

W. LOUIS CHAPMAN, M.D.

PROVIDENCE, R. I.

PROCEEDINGS OF SOCIETIES.

THIRD INTERNATIONAL DENTAL CONGRESS, PARIS.

(Continued from page 774.)

FIFTH DAY—MONDAY, AUGUST 13, 1900.

GENERAL ASSEMBLY.

THE meeting was called to order at 2 P.M. by President Godon.

The president then read two letters from Dr. Miller and Dr. Taft, expressing regret at their inability to be present at the Congress.

THE PRESIDENT. Now I will ask you to allow me to salute at this last meeting one of our *confrères*, Dr. John Morgan Whitney, of Honolulu, to whom belongs the record of distance, for he spent four weeks in coming to this Congress.

Dr. LEMERLE then read his paper entitled "Considerations on the History of Dental Art." (As a paper by V. Guerini covering the same ground was published in the January issue of the DENTAL COSMOS we omit Dr. Lemerle's paper.)

In the discussion which ensued upon the reading of this paper the following members took part: Drs. Godon, Lalement, and Lemerle.

The president then called on Dr. ERNST SJÖBERG to read his article (of which an abstract follows) entitled

CONSIDERATIONS ON THE LAW OF 1900 RELATIVE TO THE MANUFACTURE OF PHOSPHORUS MATCHES IN SWEDEN.

At a meeting of the American Dental Society of Europe, held in London in August, 1898, Mr. G. Cunningham presented a very interesting communication on phosphor-necrosis. He recommended the arresting of this disease through appropriate prophylactic treatment, by making use of modern hygiene, bringing in the services of expert dentists and obliging the workmen to follow the rules prescribed by modern dental therapeutics. This plan would open a new and broad field of work to the dentists, and would make them work in conjunction with the hygienists.

At that meeting I said that I appreciated this great idea, but nevertheless was forced to protest against it from an economical standpoint. In Sweden, for example, we have, notwithstanding the importance of the match industry, insufficient means to remunerate the services of expert dentists which are necessary to prevent the injurious consequences of the manufacture of matches. I added, while admitting that cases of necrosis are not as numerous now as they used to be, that it should not be forgotten that in order to make the plan efficacious, treatment should be given to all of the workmen, a thing that would require, in a factory of any importance, all the time of a dentist. In Sweden there is not a single factory that would, or could, afford to have a dentist at its service even if it was for the purpose of treating its regular workmen; factories that have steady men are rare, for they only remain

a short time, and employers grudge to give dental treatment to temporary employees. I ended my remarks by saying that the workmen in many factories belong to a very low class of society, and do not attach any importance to dental hygiene, for experience has demonstrated that they do not pay any attention to the condition of their mouths. We all know that the good services of the dentist are of no benefit if the patients do not themselves take the necessary personal care, hence the expenses of the dental treatment would be so considerable and the result so unsatisfactory that it would be more economical to abandon the manufacture of matches.

A year after I attended another meeting of the American Dental Society of Europe, and having considered the importance of the question, and studied it more in detail, I read a paper in which I finished my remarks as follows: "It is without a doubt needful that we should direct our efforts toward obtaining the organization of dental services in the match factories, as well as in schools, other institutions, and in the army and navy; but our greatest efforts should be made with the view of abolishing the making of phosphorus matches, the only radical way of preventing the production of that terrible disease known under the name of phosphor-necrosis." Since that meeting the situation has changed in Sweden. Some time ago a royal decree ordered that in a given time the importation and sale of phosphorus matches would be altogether prohibited in Sweden. Their manufacture is as yet permitted, on condition that the matches shall not be sold in Sweden.

It may be interesting to give here a *résumé* of the law of the 30th of December, 1896, on the manufacturing of phosphorus matches. The law says: The manufacturing of phosphorus matches is only authorized in factories especially constructed for this purpose. No person is authorized to build similar establishments unless he can prove by means of certificates that he has a sufficient knowledge of the materials used in such factories, or at least that the director is able to present such documents. The factory must be perfectly ventilated and dry. It must comprise the following special divisions: (1) One or several rooms for the preparation of the inflammable substance and for the immersion of the sticks; (2) one or several rooms for the drying of the matches; (3) one or several rooms for packing and boxing. All these rooms must be perfectly ventilated. It must in addition comprise special, well-ventilated and well-lighted rooms, one for the storing of the wearing apparel of the employees,—which must be provided by the company,—another room in which they may keep their provisions and take their meals; and lastly, a room furnished in such a way that the workmen may be able to wash themselves and to rinse their mouths after the day's work is over.

Persons under eighteen years are not allowed to prepare the inflammable substance or to immerse the sticks, and no person under fourteen years is authorized to do the drying and packing work. No person is to be permitted to work in the factory until the factory physician has examined him and found that the candidate is

able to work without fear of evil results. A workman who has undergone a dental operation cannot work again without the consent of the physician.

No workman is to be allowed to prepare the inflammable substance or to immerse the sticks for a period of time longer than a month, and is not to be allowed to undertake this work again until after a month's rest (nevertheless after such time it is not possible to detect any symptom that would indicate that the health of the workmen has suffered from the effect of the work).

The working clothes should perfectly cover and protect the street clothes. When work is over, the wearing apparel used in the factory must be stored in a special room. In the rooms where the inflammable substance is prepared and the sticks are immersed, the workmen are not authorized to remain for a longer time than is necessary, and are not to be permitted to partake of any food while in these rooms.

Article XI of this law reads as follows: A physician paid by the director of the factory and appointed by the government inspector is attached to every factory. The physician must examine all the employees at least once every three months. The proprietor of the establishment should see that all the workmen who suffer from toothache or from any gum disease should be put immediately under the physician's care.

A fine of fifteen to seven hundred francs will be inflicted for negligence in the observation of this law. In case of non-payment of the fine the proprietor is liable to imprisonment.

These were the principal points of this law, which was made for the purpose of preventing phosphor-necrosis. Has experience shown that these regulations have done good? The answer must be Yes. Is the law sufficient? Not at all. No one ignores the insufficiency of the prescriptions of the law. With regard to the certificate of sufficient knowledge of the substances used in this industry, I must say that it has not been detailed enough to be of any use. It must also be said that no mention is made of dental examinations. The essayist points out the insufficiencies of the law, but holds that nevertheless it has been the cause of great improvements.

Dr. Sjöberg discussed very carefully the text of the law, pointed to instances of carelessness in preventing the spreading of necrosis, and gave the following statistic information. He said that in southern Sweden in 1891 ten factories were in operation, which produced two hundred and sixty million boxes, of which eighty per cent. were exported, at a value of 1,800,000 francs. During that year, out of 1075 workmen employed, six cases of necrosis were observed. This is equivalent to a little over one-half per cent. These cases were benign in their nature. In seven of these factories no case of necrosis was observed, and it was in the remaining three, where the number of workmen was 468, that all the six cases were observed. These statistics are really not discouraging.

It has been supposed that with good ventilation and general hygiene, cases of phosphor-necrosis have become comparatively

few, but at the congress of the German Society of Surgery it was stated that the number of cases had increased. Riedel has observed twenty-four cases in eight years; Ziegler, of Munich, thinks that the number of cases has rather increased than decreased; and on this account various German authors are of the opinion that factories of toxic matches should be suppressed.

We hope that a new law will make it compulsory to have a dentist attached to all match manufactories, for in this way the deplorable conditions of which we have spoken will be improved.

The PRESIDENT. This paper was to have been read before one of the sections, but we are very glad that it should have been read before the General Assembly, although cases of phosphor-necrosis do not now occur in France, on account of the changes brought about in the manufacture of matches.

Dr. LEON FREY, Paris, then read his article entitled "Chemical Erosion of the Teeth."*

Discussion.

The PRESIDENT. I thank Dr. Frey for his interesting communication, which belongs to that group of papers the importance of which I pointed out in the opening exercises, as treating of diseases as yet but slightly known and concerning the pathology or treatment of which we have unsettled ideas.

Dr. ROY. I just want to say a few words in order to mention the case of a patient of mine, a woman thirty years of age, whose two upper incisors present a lesion analogous to the one described by Dr. Frey; it has been there for years, increases very slowly, and is quite deep, with an eburnated surface; I have not been able to find any etiological cause for this erosion.

SECTION III.—OPERATIVE DENTISTRY AND SPECIAL THERAPEUTICS.

The president called the meeting to order and announced that Dr. J. E. HINKINS would read his paper entitled "The Disintegration of Cement Fillings."†

Discussion.

Dr. W. V.-B. AMES. I am inclined to believe that the work done for this paper by Dr. Hinkins will mark a new era in the investigation of the causes of failure of cement fillings. It has been the fashion for some years to look upon the failure of cement, which cannot be accounted for by attrition, as the result of ammoniacal fermentation. I became satisfied several years since that this was erroneous, not from such experimentation as reported in this paper, but from observations of the comparative behavior, in the mouth, of cements which would resist the action of ammonia and those which would be completely disintegrated by that agent. I had been able to compound cements which would almost perfectly resist aqua ammonia, but which would disintegrate and waste in the mouth much more rapidly than others which were

*This article is printed at page 716 of the July issue.

†Printed in full at page 581 of the June issue.

very readily broken up by immersion in the same solution. Much of the difference in the rapidity of solution or breaking down in the acid media mentioned in the paper, can be easily accounted for by the nature of the materials used in modifying the phosphoric acid in the different cements. In the glacial phosphoric acid combination mentioned, the sodium phosphate contained in that form of acid would dissolve slightly in even an aqueous bath and very readily in one slightly acidulated. The other cement which was so extensively acted upon would no doubt yield alkaline phosphates only on analysis of its liquid component. The few really meritorious cements on the market are departures from the old stereotyped formula calling for a solution of glacial phosphoric acid. I called attention to this classification in a paper read before the Columbian Dental Congress in 1893, which I think was the first record of such a discrimination. While the ideal cement is yet unreached, we can congratulate ourselves that much has been accomplished by a few manufacturers during the past ten years. Previously there were probably not a half-dozen really meritorious cements obtainable. I knew of two only,—viz, the Poulson and Justi, and these were not applicable to all purposes. To-day, I think, the number does not exceed a dozen. The German products have a general reputation for superiority, yet in some records of percentages of failure of gold, amalgam, and cement fillings by Prof. W. D. Miller, in a recent issue of the DENTAL COSMOS, a percentage of failure of cement fillings was quoted which was astounding from the standpoint of observations in America. The chemistry of oxyphosphates is intricate and very little understood. The text-books contain no references whatever which will materially help the beginner in the study of oxyphosphates. From recorded investigations of other basic salts we can appropriate some points on the score of analogy, but even this work is very limited. Much of the review of the literature of this subject is entirely devoid of value. Many of the statements are stupendously fallacious. I trust that Dr. Hinkins will carry this work farther.

The next article was one by Dr. Twine, of Berlin. [This article was not received in the report furnished to the DENTAL COSMOS.]

Dr. L. QUINTIN, Brussels, then read his article (of which an abstract follows) entitled

TREATMENT OF INFECTED TEETH.

While calling the attention of the members of the Congress to the treatment of infected teeth, I must say that my purpose is not to point to a discovery, but rather to describe a method that I have been following for nearly six years, and which has given me results beyond my expectation. I will not give a complete description of the method of treatment which I follow now, after having tried all other methods and finding them give me always unsatisfactory results. With the method that I recommend I have only had one failure among seven thousand cases treated. I believe that a method that has given such results deserves to be submitted to the consideration of my *confrères*.

Although the application of my treatment is based on the same *modus faciendi*, I believe, nevertheless, that it is good to classify the different cases that may present themselves in the following manner:

First. Teeth with mortified pulps, either pathologically or artificially, no periostitis having been brought about.

Second. Teeth with mortified or normal pulps, but suffering from periostitis.

Third. Teeth with complicated periostitis (abscesses, fistulæ, etc.).

In the first class, where the canals have been cleaned of radicular *débris* by means of a Donaldson broach or hook, I inject in every canal hydrogen dioxid at twelve volumes. I then dry the canal by means of cotton fibers wound around a square broach, and introduce into the canal a paste of iodoform and five per cent. of formol. My first procedure is to close the apex or to get as near doing it as possible. The application of this paste is often followed by a slight sensation of pain, caused by the formalin; but I do not become alarmed on this account, for I even look for the production of this pain. After a few minutes all pain disappears. I then can fill the tooth immediately after. This is the method that I follow whenever I want to place a pivot crown in one sitting. I have no failures to record in this connection.

Second Class. Teeth attacked with simple periostitis. The first thing to be done is to liberate the canals from all foreign bodies. In this case I also use hydrogen dioxid, and do not apply any dressing. I only place a cotton pellet in order to prevent the entrance of food into the canals. At the next sitting, the periostitis being cured, I clean again the canals with hydrogen dioxid, and dry them with cotton fibers. I then introduce into the canals a few fibers saturated in a forty per cent. solution of formaldehyd. If the canals are too narrow I place a drop of formol at their entrance, and by means of a broach the antiseptic is pumped to the highest portions of the canal. I then leave in the canals a few fibers of cotton soaked in a five per cent. solution of formalin. At the next sitting I clean again the canals; I introduce my paste and fill the tooth. If necessary, I can do without the second sitting; I have done this several times without any bad effect. The case in which I was not successful belongs to this class, but I must also tell you that when the patient came to me it was the fifth time of her suffering from periostitis in the same tooth; moreover the conditions were very inauspicious. Her father and mother are arthritics, and she is a chlorotic. She asked me to relieve her as soon as possible by extracting the tooth. When I extracted the tooth, a second bicuspid, a cyst twice the size of the crown came with it.

In the third class the treatment is more rapid, because often the canals have been cleaned with hydrogen dioxid and filled with the paste, the fistula healing in three to four days. Nevertheless, I have a small remark to make with regard to the incisors, especially when these teeth have fistulæ established for a long time. In such cases we must proceed with care, for the apex is, as a general rule,

widely open; hence care must be exercised in order to prevent the passing of the paste through the apex and the coming in contact with the pericementum. I advise the use of the same amount of caution in the case of the canine. I have often observed that the treatment of this tooth has caused edema of the facial region. Nevertheless, there was no pain after percussion. I cannot explain in a positive way this particular sensitivity of the canine. This slight complication disappeared rapidly.

You are going to reproach me by saying that this treatment is not new. Certainly it is not, and I told you at the beginning of the paper that I undertook simply to describe a method which has given me very satisfactory results. I have derived benefit from the properties of hydrogen dioxid and from iodoform and formalin. I believe that in treating root-canals the aim should be to close up the apical foramen. This is why I use an iodoform paste that I force to the apical space. If in certain anemic or arthritic persons a slight irritation of the pericementum is sometimes observed, this disappears with the use of slight counter-irritation. I have never had to extract a tooth that I filled.

This *exposé* is rather intended to stimulate a discussion on the subject, and I am ready to answer any questions that my *confrères* may ask me.

Discussion.

The PRESIDENT. We thank Dr. Quintin for his communication.

Dr. LAMBERT. Dr. Quintin has spoken to us of calcification, and he told us that he obtained immediate access to the canals. When an immediate cleaning of the canal is attempted, accidents are quite likely to occur.

Dr. QUINTIN. I do not participate in your opinion; after anti-septics have been used in the root, it is necessary to explore the canal. The work must be done slowly, and good results will follow the work. I always try to convince myself that the canal is wide open, and I am not anxious about the results. I even touch the periosteum, and it never gets infected.

Dr. LAMBERT. You are lucky!

Dr. QUINTIN. The results are there. I think that the method I use for the filling of roots suffices to destroy any intoxication that I might have caused. There is no scientific theory to explain this, but the results speak for themselves.

Dr. LAMBERT. Sometimes it happens that the canals are so calcified that an explorer can hardly penetrate. In such cases accidents occur. You do not see why?

Dr. QUINTIN. I have emphasized the fact, when the canal is calcified.

Dr. LAMBERT. If the canal does not allow a broach to go through?

Dr. QUINTIN. I let it go; but when the canal is infected, it is generally sufficiently open.

Dr. LAMBERT. Not always.

Dr. QUINTIN. Infected canals are always large.

Dr. LAMBERT. I have seen cases just the opposite.

Dr. QUINTIN. Anyhow, I am not infallible. I am just describing a method that has given me good results.

Dr. LAMBERT. I do not contest your method. I only point out its inconveniences.

Dr. HEIDÉ. I agree absolutely with Dr. Lambert. When the canal is calcified, it is impossible to introduce an explorer and to examine the existing conditions, even when it is only partly calcified. I think that Dr. Quintin is mistaken. It is impossible to say when the tooth is calcified.

A MEMBER. I follow a method which has also given me good results. I have had caries of the fourth degree that I have treated successfully.

Dr. QUINTIN. I consider that when the papers in the program are prepared in good time they should be printed. In the next Congress all the communications should be printed in anticipation.

The PRESIDENT. This has been done.

A MEMBER. My method in these cases is to use creasote.

Dr. QUINTIN. I do not contest that plan.

A MEMBER. I have used iodoform cement, and have never had to complain from using it.

Dr. QUINTIN. Liquid?

A MEMBER. Yes, very liquid.

Dr. QUINTIN. It is precisely the principle that I recommend.

The PRESIDENT. I see that we are all of more or less the same opinion.

A MEMBER. I do not know if you remember that about two or three days ago one of our *confrères* gave at the Ecole Dentaire a demonstration of a method very much resembling Dr. Quintin's, and I must say that his treatment relieved me very much. It has cured me of a case of caries of the fourth degree. It was a tooth which made me suffer very much, and it was sensitive to pressure when closing the mouth. He pumps the medicament into the root. There is no danger around the extremity of the root. The liquid that comes out effervescing carries with it all the microbic portion, which is detached.

Dr. QUINTIN. Also the purulent materials. There is a drawback to the use of sodium. The treatment of roots by sodium is based on the combination of sodium and water; the sodium combines with the oxygen of the water and produces an intense heat. The tissues can be rendered aseptic. In this way even the particles that are beyond the apex are rendered aseptic.

Dr. HEIDÉ. I will try to establish harmony between the two opinions. If, for example, a canal is calcified, if it is infected, you can introduce an explorer, but if there is no infection you cannot do it. Let us take the case where infection exists. If an instrument is introduced in the canal, it can also be enlarged. This is the very ingenious method of our *confrère* Quintin, which gives such good results with regard to the removal of the food *débris* that are found in the root. What I consider to be essential is to enlarge the canal freely before washing it with hydrogen dioxid. I insist upon this point. It is my opinion that the infected layers

of the walls of the canal should be removed. I believe that the method used by Dr. Quintin is excellent, and that very good results will be derived from it.

Dr. QUINTIN. I thank Dr. Heidé for his words of encouragement. He is familiar with the treatment of teeth, and hence his statements are authoritative; but I did not expect him to object to my method. I do not agree with him. I never enlarge the canal in order to simplify the operation. I do not think that is necessary. The only thing that I want is to close the apex. I do not trouble myself with the shape of the canal. I only want to close the apex, and the way of doing it is simple: I use an explorer. When the canal is not large enough I try to enlarge it by means of a square broach.

Dr. HEIDÉ. The antiseptic *par excellence* is the scraping of the canal.

Dr. QUINTIN. This is what I said in the beginning; there are, maybe, sixteen methods. We have the aseptic method. We cannot use aseptic methods in connection with dental operations, and I am of this opinion especially since the studies of Choquet have shown us that the canals are infected with microbes and spores. When it is the question of treating caries of the fourth degree we cannot be sure of asepsis, hence we must use antiseptics. I treat the end of the tooth as though it were an inert body. I know then that the microbes cannot go beyond the apex and produce decomposition of organic materials.

Dr. Quintin concluded his remarks by asking his *confrères* to study carefully his method, and to report their results at the next Congress.

The president then called on Dr. FONTANELLE, of Vouziers, to read his communication (a short abstract of which follows) on

LYSOL.

Lysol is a product that has been in use only a few years. According to Gerlach, its discoverer, it consists of the incorporation of oils of tar into soaps in the nascent state. When coal tar is distilled, and the heavy oils that pass between 190° and 210° C. are collected, creasote is obtained. When this is rectified and collected between 195° and 205° it gives a product that contains ninety per cent. of *Cresylol*, the remainder being formed of xylol, guaiacol, creosol, etc. *Cresylol* is a perfect germicide in the proportion of 0.3 per cent. It has the same antiseptic power as a solution of mercury bichlorid, —0.25 to 1000,—but does not have its toxic properties and inconveniences. *Cresylol* is then rendered soluble, for it is entirely soluble in water, and is incorporated into an alkaline soap. It is this product which is called *Lysol*. (Tison.)

This drug was studied in Germany, then in England, and at last it became of interest to us. It was used in the Ecole d'Alfort, Pasteur Institute, Faculty of Medicine of Nancy, where Professor Schmidt recognized that it had antiseptic properties superior to those of carbolic acid; also at the Veterinary School of Lyons, but especially at St. Joseph Hospital, where Dr. Tison uses it daily in

gynecology, otology, in the therapeutics of infectious diseases, and for disinfection.

Dr. Darteyre, in his thesis presented to the Faculty of Medicine of Paris, gives us very complete information from a bacteriological standpoint. We will quote a few of his results: A one per cent. solution of lysol killed pneumococci in five minutes, the bacillus diphtheriæ in five minutes, the cholera bacillus in one minute; a 0.95 per cent. solution killed the typhoid bacillus in one minute; the anthrax bacillus is killed in one minute in a 1.9 per cent. solution. As a matter of comparison with carbolic acid, I will quote that a five per cent. solution of lysol kills the anthrax spores in five days, while a solution of carbolic acid of similar strength takes ten days.

Lysol can be considered a good antiseptic. It is not toxic nor irritant; its odor, although it is not agreeable, is less penetrating than that of iodoform, and one gets accustomed to it with as much facility as to carbolic acid.

Cramer and Whemer, in the hospital of Wiesbaden, have used lysol in connection with one hundred and twenty large surgical operations for the irrigation of wounds; in nearly every case healing occurred by first intention. I want to remark that the best results have been obtained in the treatment of infected wounds, of phlegmons, of abscesses; in fact, the temperature decreased after a single washing with lysol.

For the washing of aseptic wounds it has been demonstrated that a one per cent. solution is sufficient; two per cent. should be used for infected wounds. With a solution of this strength the washing of the field of operation, the hands, and instruments can be made in a perfect manner.

Studying the observations collected by Dr. Tison at St. Joseph Hospital, I noticed that when administered internally to a typhoid fever patient it removed the infectious odor from the excrements. I hence thought that I was in the presence of a unique disinfectant, and especially of a deodorizer. I learned from the study of these same observations that every time that a purulent sac was irrigated with lysol the suppuration ceased very rapidly.

I will now quote a few confirmatory observations:

Case 1.—Mons. H. J., of Réthel (Ardennes), twenty-nine years of age, presented himself to me in consultation January 15, 1898. After an examination, I decided to extract all the teeth of the superior maxilla, for not a single one could be preserved; the only things left were *débris* and roots. The condition of things in the inferior maxilla was more or less the same, except that the incisors and canines had resisted the action of caries.

I recommended to my patient the frequent use of lysol solution as a mouth-wash, and gave him an appointment for the 20th. On that day the patient was put under the influence of chloroform by Dr. B., and I performed the operation.

With a strong syringe I irrigated freely all the alveoli, and prescribed the frequent use of gargles with a one per cent. solution of lysol.

The patient went home, and on the 22d I examined him again.

I did not observe any trace of inflammation. Eight days afterward the healing of the gums was complete, and a month after the extraction of the teeth the patient was wearing a temporary appliance.

Case 2.—On July 4th Mons. G. presented himself at my office. He had never before suffered from dental troubles. The head was bandaged, the mouth could not be opened, and a fetid odor could be perceived. This condition was produced by deep caries of the lower right third molar.

I decided that an operation was of immediate necessity. I prescribed the frequent use of an emollient, followed by washes with lysol.

On July 6th the patient came back to my office. The conditions were more or less the same, the occlusion of the jaws being in the same state; but I was surprised to find that the odor had nearly disappeared. As my patient could not nourish himself, and as this condition could not last any longer, I insisted again upon the necessity of a surgical intervention. He finally decided to submit to the operation.

On July 7th, the patient being under chloroform, I forced the mouth open and extracted the tooth. Dr. H., who administered the anesthetic, examined the alveolus with the finger, and found that a large and movable sequestrum was present. I removed it; it was a large portion of necrosed alveolus.

On July 8th there was no fever nor odor; the 9th the same conditions were present. On the 10th the patient could open the mouth, and the gums were healing very nicely. The post-operative treatment had consisted only of irrigations and washes with a one per cent. solution of lysol.

Case 3.—Mons. B., of the Third Cuirassiers, presented himself to me for consultation on February 10th, and complained of a deafening pain in the anterior portion of the superior maxilla. All the face was sensitive; the right ala of the nose was very much swollen. Sleep became impossible, and the right central incisor could not come in contact with the lower teeth without provoking pain. I examined the mouth, and found that a number of teeth had been treated and filled, and that the central incisor itself had a platinum filling. The gum was very much swollen. This phenomenon was caused by an abscess. Immediately and with great precaution I removed the filling, and with a drill I opened the pulp-chamber. Immediately afterward a stream of pus came out. I cleaned the canal and injected one per cent. solution of lysol.

I then ordered the patient home, after having applied a lysol dressing. He came back every day, and soon I had the satisfaction of seeing the inflammation disappear, as well as all the accompanying phenomena. On the 20th I was informed by my patient that he would leave town for fifteen days. I washed the canal again, placed a lysol dressing, and inserted a gutta-percha filling. After a month everything was very satisfactory. I then removed the dressing, filled the canal with gutta-percha and the crown with cement.

Discussion.

Dr. SALESKY. How does Dr. Fontanelle perform the washing of the canal with lysol? Is it with pure lysol?

Dr. FONTANELLE. With a one per cent. solution.

The PRESIDENT. We shall try the method and see the results.

Dr. R. HEIDÉ then read his article (of which an abstract follows) entitled

DENTIFEROUS CYST CAUSED BY THE LATE ERUPTION OF A CANINE TOOTH.—PRESENTATION OF THE PATIENT.

Cysts of the jaws have been the topic of many works since Scultetus, who in 1654 in his "Armamentarium" published the first observations, although ignoring their dental origin, until our modern authorities, Magitôt, Malassez, and others. In 1722 F. L. Petit speaks of soft exostoses of the maxilla, which in all probability were dental cysts. In 1728 Fauchard speaks of liquid tumors which were brought about by lesions of the teeth. Runge, in 1750, is the first one to observe the parchment sound of which Dupuytren made later on a characteristic *bruit*. Bordenave, in 1768, and Marclot, in 1774, described cases of exostosis whose characteristics permit of their being compared to true cysts. Jourdain, in 1778, recognized again the parchment sound, and observed a series of tumors of the maxillæ formed as a consequence of dental caries, or of the incomplete extraction of a tooth.

Delpech, in 1816, was the first one to plainly establish the relations between maxillary cysts and alterations of the dental system, but we owe to Dupuytren a true scientific description of cysts of the maxillæ. The observations from that time multiplied in number: Blasius, 1835; Lombard, 1836; Syme, 1838; Diday, 1839; Velpeau, 1847, and especially Forget in 1840 and 1853, who described new facts, but without enlightening our knowledge on the pathogenesis of the disease. Quibout, in 1847, defines more accurately the relations between the cysts and the teeth. He expresses himself on this subject as follows:

1. The cysts may be due to a pathological state of the dental follicle.

2. They can be the result of a defect in the dental evolution.

Broca, in his treatise on Tumors, speaks of—

1. Progenic or pre-existent cysts (embryoplastic, odontoplastic, coronal).

2. Neogenic cysts (formed outside of a pre-existent cavity).

3. Perigenic cysts (developed around a foreign body).

The true dental or alveolo-dental cysts, as they were called at that time, are those designated under the name of progenic, and originate at the expense of the dental follicles at any period of their evolution. Broca says their contents are usually a limpid serous liquid, sometimes a sanguineous one; their consistence is at times flowing, at others gelatinous. Sometimes, but very seldom, it is a sebaceous matter which may acquire the consistence of putty; this is composed principally of a collection of epithelial cells (Nélaton). These come from the wall of the follicle, whose internal surface is

covered in the normal state by an epithelial layer which separates it from the enamel organ. Broca looks upon the neogenic and perigenic cysts as being doubtful. Magitôt (1872-1873) thought to have proved that all maxillary cysts are essentially and exclusively of dental origin, and admitted the follicular cysts (progenic of Broca), alveolo-dental or periosteic (neogenic of Broca), and the perigenic cysts, excessively rare, according to him. The theories of Magitôt gave rise to discussions whose echoes persist even yet.

According to Verneuil, Reclus, Nepven, and Malassez, the origin of the so-called periostic cysts would be due to a persistent embryonic state. According to these authors, they originate from the epithelial *débris*, the remains of the budding of the cord of the temporary and of the permanent teeth. Verneuil and Malassez, although they share the same opinion, differ a little on one point. Verneuil thinks the epithelial buds of the cord may have given rise to cysts at a certain moment by the simple production of a serous fluid at their interior. Dr. Reclus, in a remarkable article on terebrant epithelioma of the superior maxilla (*Progrès Medical*, 1876), confirms the ideas of Verneuil. He remarks that there are cases in which the etiological conditions pointed out by Magitôt are completely lacking, and questions if it would not be more natural to believe in a dilatation of the epithelial cylinders, which become filled up with a serous fluid, instead of making a hypothetical inflammation intervene.

Dr. Malassez believes that the cystic cavity is the result of the dilatation of an epithelial *débris* by a production of secretion; the cavity would not be produced at the center between the denuded tooth and the hypertrophied *débris*. *Dr. Malassez recalls that the enamel organ during the period of its development produces a considerable quantity of epithelial buds, whose traces can be found all through life.*

Under any influence, most frequently through an irritation of the neighboring region, says Frey in his book, this epithelial *débris* remains a long time inactive, and then they would begin to develop; to produce buds which would give rise, according to their mode of development, either to a malignant tumor or to peridental (Verneuil and Reclus) or to paradental cysts (Malassez). Hence these authors consider the epithelial *débris* of the cord that have remained in an embryonic state as the starting-point for these cysts. These masses develop; the central cells melt and produce a serous liquid, while the peripheral cells arrange themselves in the shape of a wall limiting a sac.

Magitôt stated his opinion in the Congress of Surgery in 1896 in the following absolute manner:

First. Every periosteic cyst invariably originates exclusively in the *apex* of the root of a tooth, and is caused by a previous and sometimes remote lesion of the organ. It has for a direct agent an inflammatory production of liquid, which raises the layer of ligamentous tissues circumscribing the apex, which remains free in the cavity.

Second. This mechanism is common to the sub-periosteal

abscesses and to the cysts, the difference in the process depending exclusively in the inflammatory intensity and in the nature of the pathological product,—purulent in the first case, serous in the second.

Third. In certain quite frequent cases of chronic periostitis of the apex, with discharge from the canal and penetrative caries, the retention of the liquid by obstruction of the outlet brings about the formation of an abscess or of a cyst.

Fourth. There is no clinical nor anatomo-pathologic fact whose origin should establish the origin of a cyst of this variety in the epithelial *débris*, either intra-osseous or inclosed in the thickness of the ligament. In consequence the term paradental cyst is not exact.

Fifth. The presence of epithelium in the internal surface of a cyst has been sufficiently established by the nature of the wall, which is none other than the envelope of the follicular sac, and which during its follicular period is provided, as is well known, with an epithelial covering, of which it preserves traces until adult age.

We cannot discuss in detail this serious question. We will only remark that in his thesis on dental cysts (1886) M. Laforesterie, whom we have quoted more than once, examines with care the reasons which are in favor of the theories of Magitôt and Malassez, and his conclusions are more or less favorable to the theory of Magitôt, at least in what concerns the formation of radicular cysts (radiculo-dental of M. Malassez). Since then the researches of Albarran (*Revue de Chirurgie*, 1888) have corroborated the ideas of Malassez, which nevertheless M. Heydenreich ("Traité de Chirurgie") does not consider as yet having been demonstrated in an irrefutable way.

After this introduction, necessary to explain the genesis and the attempts at classification of cysts, I come to the description of my observation:

Mme. X., who is here present, is fifty-nine years of age. Her face indicates a plethoric subject; her obesity is very marked. With regard to family history, there is nothing of interest; all her family were always in very good health. She married young, and has nine children, all in good health.

Mme. X. says that twenty years ago she felt the first symptoms of hepatic colic, which only lasted for a short while. Some time after she had a salpingo-ovaritis, which terminated in an abscess in the ovary. The menopause took place at the age of fifty-five.

Mme. X. says that she has suffered from the teeth, and that she had many teeth extracted. According to her, the upper incisors and canines became loose and fell out. The roots of the right lateral incisors and canines are present. In 1897 the patient observed the appearance at the level of the myrtiform fossa and the canine fossa of the left side a swelling that at first was of the size of a lentil, but which later on became as big as a small nut. This tumor developed progressively until 1899. At first it was indolent, but gradually it caused pains which were of a neuralgic character. The patient consulted her physician. He opened the tumor and a liquid of a light yellow color mixed with blood came

out. This proved insufficient, and the physician made a subsequent incision, but deeper, when blood of a dark hue came out. Everything then seemed to go back to the normal state, but the improvement was only of short duration. The tumor reappeared, and in February, 1900, the physician sent the patient to me.

When the patient came to see me her physiognomy was very much deformed. The upper lip and the wing of the nose of the left side projected forward.

From the local examination, I concluded the presence of a tumor slightly hyperemic, fluctuating, and painless. It extended in height from the naso-labial fold to the alveolar crest; in width it projected beyond the region occupied by the root of the left first bicuspid, and terminated in the lateral wall of the nose, filling up the myrtiform and the canine fossa. The size was that of a pigeon's egg. I concluded that it was a cystic tumor. By means of the galvano-cautery, I made an opening in the most dependent portion of the tumor. A serous, odorless liquid came out; the ichorous discharge was followed by slight bleeding. With a sound I explored the cavity. I found two cavities joined into one: the first a fibromucous, followed by a second one, an osseous. Persuaded that I would find a root or another foreign body, I continued the exploration, and finished by finding a hard body denser than bone. Was it a root or was I in the presence of a tooth of retarded evolution? In order to obtain a better view of the cavity I filled it with iodoform gauze. Two days afterward the dressing was removed, and I could then see plainly the bottom of the cavity, which was within the substance of the superior maxilla and penetrated a centimeter and a half. A hard and white body could be seen in the bottom; it was the crown of a tooth horizontally placed in the osseous tissue in the direction of the canine fossa toward the median line of the face. This crown presented the anatomical characteristics of a canine as far as it was possible to examine the cavity. I also observed that the triturating point of the crown had undergone a complete disorganization.

The patient consented to have the tooth extracted. I performed the operation in the surgical clinic of Dr. Aubeau. The patient was placed on the operating table, and, after a strict antisepsis, I made injections of tropacocain. I then made an operation with a chisel and mallet, in order to be able to extract the tooth. I used a cutting forceps with thin beaks. I grasped the tooth at the neck and made some movement of luxation. After powerful traction in the horizontal direction, I gave some movement from below upward, which brought back the tooth to the cystic sac, from which I turned it out. I then *curetted* the cavity.

The patient did not suffer very much during the operation. The tooth was a canine, but it had undergone a disorganization of the point of the crown; the root was curved at its extremity, forming altogether a hook. A strict antisepsis was practiced after the operation, and the wound was filled up with iodoform gauze. The dressings were renewed every day, and were carried every time to a less depth,—a thing which favored the formation of healthy granulations.

The only thing that remains for me to do is to determine the origin of this cyst and to classify it. According to Broca, this cyst would belong to the perigenic variety, for it has developed around a foreign body which in our case is a tooth. This tooth, by its evolution, irritated the epithelial *débris*, the remains of the enamel organ; this *débris*, when irritated, began to develop to hypertrophy, and, according to the theory of Malassez, the cystic cavity would be formed through the dilatation of this *débris* by secretion, and it is not at the center of the mass, but between the denuded tooth and the hypertrophied *débris*.

Dr. Malassez designates under the name of dentiferous, or dental cysts, an epithelial neoformation of paradental origin and of adamantine type, in the shape of unilocular cyst in relation with a complete tooth.

The cyst which forms the subject of our observation seems to answer to this variety. Dr. Malassez says especially of dental cysts: "They differ from radiculo-dental cysts, inasmuch as in the latter it is the root of an erupted tooth which makes the protrusion, while in the dentiferous cyst it is the crown of an included tooth, no matter whether it be temporary, permanent, or supernumerary."

In our case it is a canine tooth which occupies the cystic cavity. We are hence in the presence of a paradental cyst of Malassez of the dental variety.

No discussion followed the reading of this paper.

Dr. ANTONIO BACA Y SANCHEZ, Malaga, Spain, then read his article (an abstract of which follows) entitled

SUPPURATION OF THE ANTRUM OF HIGHMORE CONSECUTIVE TO DENTAL CARIES.

The patient was a young lady, twenty-two years of age. She had a tooth attacked with caries of the second degree, which had been filled with a paste of oxychlorid of zinc. After a time the filling dropped out, and through traumatism or pressure the pulp became mortified, and as a consequence decomposition occurred; a serious infection was present. The patient did not return for six days, and I was called into her home, where I found her suffering from great pain and swelling of the corresponding cheek. The temperature was high. An important symptom was the expulsion of matter through the nose on the affected side in profuse quantities. This diagnosis of suppuration of the sinus was confirmed by Dr. Lazarraga, who, with the aid of the electric lamp, reached the same conclusion. In view of this, and as evacuation of pus was the only rational treatment, I proceeded to accomplish it. For this purpose I extracted the first molar after a previous injection. As the consequence of the extraction of the second bicuspid eight years before this disease, the first molar had lost its primitive relations, and its roots were contiguous to the lower wall of the sinus. Immediately after, and by means of the electric engine and a perforating bur, I made an opening in the tissues which separated the bottom of the alveolus corresponding to the posterior external root,

which was the affected one, and the lower wall of the maxillary sinus. My surprise was great when I saw that no matter would come through the opening, but I understood the reason very soon; it was due to the pus being confined to the posterior portion of the sinus on account of the inclined position of the head, and also because there was not very much pus, as a great quantity had escaped when the surgeon made his examination with a puncturing sound. I enlarged the opening with a larger bur; I placed a rubber tube in the cavity, into which I adapted a syringe. The cavity was syringed out with one hundred and fifty grams of sterilized water, which came out through the nasal orifice mixed up with pus. I repeated the injection until the liquid came out clear, and I concluded by injecting air in order to prevent any water from remaining in the cavity. The opening was closed with iodoform gauze, which was introduced into the cavity to prevent premature healing.

The injections were repeated during the five succeeding days, and the liquid came out always completely clean. Not doubting that the suppuration was suppressed, I placed a prosthetic appliance, which consisted of two gold bands, a base of vulcanized rubber with half a molar tooth attached to it from which a rod of soft rubber projected; this crossed the alveolus and reached the sinus.

After a month, seeing that no suppuration was present, I freshened the edges of the wound, which healed, the opening becoming completely closed. During the treatment no fever or complication of other nature took place.

Conclusions.—Considering the relative frequency of suppurations of the sinus, it becomes indispensable that the dentist should know in detail the anatomy of this region and the intimate relations between dental pathology and that of the sinus.

The trepanation of the maxillary sinus through the affected alveolus is an operation which belongs to dental surgery, and the technique of which should be known in all its details by those who devote themselves to dental practice.

Dr. JUAN M. ALBERDI, Madrid, then read his article (an abstract of which follows) entitled

INFLAMMATORY AND ORGANIC LESIONS OF THE TEETH.

We will describe successively under this title (1) spontaneous luxations of the teeth, (2) resorption of the roots, (3) osteo-periostitis, and (4) dental caries.

1. *Spontaneous Luxations of the Teeth.*—These luxations are brought about by a progressive disintegration of the teeth, accompanied by reabsorption of the bony alveolar wall and atrophy of the gum. This affection occurs spontaneously in adult age, and is analogous to the phenomenon of spontaneous, and senile, and not infrequently hereditary loosening of the teeth. It takes place sometimes in one of the isolated teeth; very frequently in a molar or upper canine, and may extend to all the regions of the mouth. It does not seem to have any relation with any other dental disorder, and as a general rule the tooth is intact. At first it is not accompanied either by pain, alveolar suppuration, or inflammation of the

neighboring gingival tissues, as is the case with osteo-periostitis, which we will describe later on.

The first painful phenomenon that occurs is a neuralgia of the dental nerve, with irradiation or reflex location in one or more points along the course of the trifacial of the corresponding side. These neuralgias are the result of the exposure of the nervous filaments, brought about by the spontaneous luxations of the teeth. The pain of neuralgic character is sometimes complicated with other pains, caused by the slightest contact with the air or with a foreign body. Mastication becomes impossible, and contact with anything causes pain. If the affection is left to itself, the dental pulp becomes highly irritated, and the tooth hyperesthetic.

The treatment of this affection varies according to the strain to which the tooth has been submitted. If it is a single-rooted tooth, it is nearly impossible to avoid extraction. If the affected tooth is a molar and only one of the roots is affected, Dr. Magitôt advises the amputation of that root. All the troubles cease immediately, and the tooth, supported by its other roots, will preserve sufficient firmness to perform its functions.

2. *Resorption of the Roots*.—This condition was pointed out long ago by Duval, Tomes, and Magitôt. It is characterized by the progressive destruction of the root. The disintegration proceeds from the apex to the neck, and can be compared with the phenomenon of the destruction of the roots of temporary teeth during the time of the eruption of the permanent teeth. There are three kinds of tissues which suffer from this phenomenon; these are the alveolo-dental periosteum, the cementum, and the dentin. This disease progresses very slowly, may last many years, and is caused nearly always by traumatism. A violent shock, while not bringing about the loss of a tooth, produces such an organic disturbance that the blood-supply is cut off, and the tooth loses its right to remain among living tissues. The teeth which suffer from this lesion are, in fact, pulpless, the organs having been lost through gangrene, and present the bluish and black coloration. As resorption is a continuous phenomenon, it happens that at a certain moment, when the entire root has disappeared, the crown falls out of the mouth. It can then be observed that it presents an irregular surface.

There is no treatment for this affection. If the tooth is causing pain, extraction should be performed. If no phenomenon of this sort occur, the disease should be left to itself.

3. *Alveolo-Dental Osteo-Periostitis*.—Under this name Magitôt has described a very common dental affection. It was called alveolar catarrh by Jourdain; alveolo-dental pyorrhea by Toirac, and expulsive gingivitis by Marechal de Calvi. It is characterized anatomically by a continuous and slow destruction of the periosteum and of the cementum. This justifies the name given to this disease by Magitôt. It brings about changes in the position of the teeth and suppuration of the alveoli.

The causes of this affection are numerous; heredity is the most common one, and next in order come general disturbances of nutri-

tion, diabetes, albuminuria, whose constant symptom is osteo-periostitis.

The treatment of this disease has preoccupied very many physicians, because it has the characteristics that we have described and also because it is very rebellious to therapeutic measures. All varieties of astringents and caustics have been used. Vidal used alum, chlorid of zinc, perchlorid of iron; Marechal de Calvi used tincture of iodine.

Dr. Magitôt originated a treatment which is the only one that has given good results. This treatment consists in cauterizations with monohydric chromic acid. This caustic is applied to the interior of the alveolar cavity. The application is nearly painless, and is repeated every six or eight days. In the meanwhile potassium chlorate in doses of two to three grains a day is prescribed, mild laxatives every four or six days, and applications of vegetable astringents morning and evening.

4. *Dental Caries*.—Dental caries is characterized by a progressive and continuous destruction of the hard tissues of the tooth, which proceeds from the exterior to the interior of the crown, and which may bring about the total loss of the crown and the ultimate disorganization of the root.

This affection is peculiar to dentin and enamel. The other dental tissues only suffer from the consecutive lesions, which are also special to these tissues and should be considered as such.

Dental caries, from an anatomical point of view, as well as from the standpoint of the symptoms and treatment, is divided into three periods: (1) Caries of the enamel, (2) caries of the dentin (non-penetrating), and (3) deep and penetrating caries, which has invaded the central cavity of the pulp.

The treatment will vary according to the three periods of the disease. In the first period, caries of the enamel, if the cavity occupies the cutting edge the affected surface may be removed by means of files or burs, and after cauterizing the surface the disease may be pronounced cured. If, on the contrary, the cavity occupies the center of a molar, it should be filled without any preparatory treatment.

In the second period of caries grinding away of the surface should not be resorted to. Therapeutic means should be used to meet such symptoms as are present, and the cavity should be filled after making sure of the tolerance of the tooth. The problem consists in obtaining from the central pulp the production of secondary dentin, which should obliterate the tubuli and render the dentin dense and homogeneous. The astringents, such as carbolic acid, tannic acid, and even sometimes arsenous acid, in small doses may bring about this condition, and provoke the formation of new tissue. Lefoulon recommended a mixture of alum and acetic ether. These several astringent applications should be preceded by sedative or anesthetic treatment in order to avoid the production of pain, due to the irritation of the pulp, and also to permit the organ to regain its functions, and hence to produce dentin. The following are the formulæ used by Magitôt:

1. Chloroform,
Sydenham's laudanum, āā 2 gm. M.
2. Tincture of aconite,
Dutch liquid, āā 2 gm.;
Tincture of benzoin, 8 gm.
3. Chloroform,
Pure creosote,
Sydenham's laudanum, āā 2 gm.;
Tincture of benzoin, 10 gm.

In the third period—that is, when the pulp is exposed—the first thing to be done is to mitigate the pain, which generally is very acute. If the opening is very narrow, a production of secondary dentin can be brought about. The agents to be used are, as in the previous case, tannic acid, carbolic acid, etc. But it is very difficult to obtain such a result, and when one is sure that this work cannot be accomplished the pulp will have to be destroyed.

Lesions Peculiar to Each of the Dental Tissues.

Diseases of the Cementum.—The most common ones are of inflammatory and organic nature. The inflammatory affections are osteitis and necrosis. These two disturbances are closely related to each other, and nearly always are the consequence of a periostitis which compromises the vitality of the cementum.

When an alveolo-dental periostitis supervenes after a traumatism, deep caries, or from any other cause, its resolution is rapid if the periostitis is acute, and the cement generally does not suffer any alteration; but if it is chronic and suppuration is present, the cement will suffer some alteration. Sometimes the periostitis begins at the apex, at a point that corresponds to the greatest thickness of cement. The surface of the root, when denuded of its periosteum, is rough, and presents sometimes sharp points. With great frequency the disease begins at the neck of the tooth, and as the layer of cement at this point is very thin, it undergoes very soon a gradually progressive resorption. The dentin is exposed, and on this account the periosteum and gum-tissue cannot adhere any more to the tooth, for the dentin cannot come in direct contact with the alveolus. If the destruction is partial and limited, that is, if the apical portion is the only one attacked, the remaining portion of the tooth being healthy, the tooth is not in danger of coming out. This happens with periostitis, cysts, and abscesses of the apex of the root, lesions which do not bring about the casting out of the tooth.

The organic affections of the cementum are very common, and represent what has long been designated as exostosis, which is of two forms. The symptoms are a dull pain, which has a localized neuralgic character, with or without irradiations. The painful sensation is similar to the one produced by the slow and progressive compression of a nerve. The tooth is not loose; on the contrary, it is very firm,—a condition that should be remembered when extraction is practiced. In spherical exostosis of the apex extractions become very difficult. It should be observed that bone tissue when

hypertrophied is more like cementum than in the normal state. The treatment of this affection is the following:

First. Extraction, if the condition of firmness and resistance of the organ allow it.

Second. Abstention and the use of palliative media.

Among the latter we recommend blood-letting, narcotics, and more particularly Magitôt's treatment, which consists in sectioning the nerve filaments which penetrate into the tooth through the apex, for it is the compression of these nerves which is the cause of the pains.

Affections of the Dental Pulp.—These are traumatic, inflammatory, and organic.

The mortification of the dental pulp results from a blow to one or several teeth, or from contact with bodies of very low or very high temperature. It is characterized by great sensitivity of the tooth, a sort of total hyperesthesia. In simple cases it terminates by inflammation of the pulp.

The inflammatory affections are pulpitis and gangrene. The organic affections consist in tumors, which reside in this organ. The tumors of the pulp are hypertrophied productions, brought about by the simple hypergenesis of the normal elements of the tissue. The tumors are always the consequence of some lesion, especially of penetrating caries, with exposure of the central organ. They are smooth, of a grayish color, and are sometimes of considerable volume; and are covered by a pellicle, which is only a thickening of that which covers the normal pulp. As a general rule these tumors are limited to the carious cavity, and extend beyond it very rarely. The most insignificant contact determines pain and provokes hemorrhages, which sometimes are very copious. The principal evil resulting from this condition is that it prevents the use of the corresponding side of the mouth. This condition may bring about disturbances of the teeth or gums, deposit of tar, etc. The treatment consists in the removal of the pulp.

Affections of the Alveolo-Dental Periosteum.—These are inflammatory and organic.

The inflammatory affections comprise acute and chronic periostitis and sub-periosteal abscesses and cysts.

Alveolo-dental periostitis is a very common affection. It can be spontaneous,—that is, without any appreciable cause,—or can be brought about by a traumatism or by the contact of a hot or cold liquid. It develops frequently during the course of caries, and very often in the last periods of this disease, when the pulp has disappeared and the crown is partly or totally destroyed.

Anatomically speaking, the inflammation of the periosteum is characterized at first by its loosening, and by the production of pus on its inner surface. During this period the disease extends over the neighboring parts, and causes an abscess which opens through the gums or skin.

Symptoms: A continuous pain is present. The tooth, as in the case of pulpitis, does not well bear changes in temperature. The tooth is raised in its alveolus; the slightest contact and the approxi-

mation of the jaws are the cause of great pain; the gums are red and tumefied, and sometimes the inflammatory phenomena are so considerable that they can bring about necrosis of the maxilla and disorders which endanger the life of the patients. Cases of this kind are not rare, and there is no hospital surgeon, probably, but has witnessed serious disturbances which have as their sole cause an alveolo-dental periostitis. In these cases, when the periostitis exists in an upper lateral tooth, a perforation of the maxillary sinus may occur.

The treatment of periostitis varies according to the period and the intensity of the inflammation. At the beginning, when there is only a simple hyperemia of the membrane, if the affection is spontaneous or traumatic, scarification of the gums will bring about very soon a complete cure. If the periostitis is threatening to bring about serious consequences, extraction should be practiced. We should not wait until the inflammation subsides before extracting the tooth.

The alveolo-dental periostitis can take sometimes a form more clearly localized, and can be limited to the alveolus without attacking the neighboring walls. We mean the cysts or sub-periosteic abscesses, which generally occupy the apex of a badly-decayed tooth. The size of these cysts varies from that of a pea to that of an egg. Their wall is formed by the thickened periosteum, and the cyst holds a purulent liquid which sometimes contains cholesterolin.

In such cases the symptoms are different. There is no elongation; the cyst develops slowly; the pain is dull, but continued, and the patient complains of a fixed and invariable pain in a point corresponding to the level of the affected root. In such a case, if the pain is too acute, extraction will have to be practiced; but if it is slow and not well marked, extraction will not be required.

The organic affections of the periosteum are of two forms,—polypi and true tumors. The polypi of the periosteum occupy ordinarily the neck of the tooth. Caries is the cause of their production, on account of the irritation which it determines at the border of the membrane. The polypi have their peduncle fixed to the edge of the periosteum, and its mass occupies the cavity. They are formed through a hypergenesis of the fibro-plastic elements and an interposing amorphous and granulated matter. These tumors are not painful, and when they occupy a cavity of decay they can be taken for tumors of the pulp. The treatment consists in the excision of the tumor, followed by cauterization of the point of attachment with the electro-cautery.

Tumors of the dental periosteum were studied for the first time by Magitôt. They are of a variety of forms, and can occupy different points in the alveolar membrane. We are in the dark as to the causes of these tumors, which very often appear in teeth devoid of caries. Histological examination reveals the presence of many elements. Some have the exact composition of cancerous tumors. The disease is generally limited to the dental periosteum, the neighboring tissues suffering only from inflammatory complica-

tions. Notwithstanding this, Dr. Magitôt pointed out many cases in which several teeth became affected after the extraction of the first one.

The symptoms of these lesions are marked: elevation and deviation, painfulness to pressure, intra-alveolar hemorrhage, abundant suppuration, consecutive gingivitis, frequent inflammations and abscesses of the gums or of the facial and cervical regions. The particular character of these phenomena consists in the appearance of inflammatory crises at intervals of a month. The only treatment against this disease is the extraction of the tooth. If the entire tumor is extracted with the tooth, there is no danger of recurrence, but if fragments remain attached to the alveolar walls, they must be destroyed with the cautery or with caustics.

No discussion followed the reading of this paper.

The next item on the program was a paper, in the Russian language, by Dr. TCHEMODANOFF, entitled "Amputation of the Pulp of Deciduous Teeth."

(To be continued.)

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

THE First District Dental Society of the State of New York held a regular monthly meeting Tuesday evening, November 13, 1900, at the New York Academy of Medicine, No. 17 West Forty-third street, New York city; the president, Dr. W. C. Deane, in the chair.

The secretary stated that in behalf of Dr. W. S. Carruthers, of Galveston, Texas, acknowledgment had been received of the donation of one hundred and twenty-six dollars from this society, with expression of fullest appreciation of the society's generosity. Members of this society have since contributed to the amount of thirty dollars to be applied to the general fund for the relief of dentists who have suffered in the Galveston disaster. These contributions as received were forwarded to Dr. H. W. Lubben, of Galveston, who responded in grateful acknowledgment.

The secretary then read the paper of the evening, which had been prepared for this society by WM. D. TENISON, D.D.S., a few days prior to his death.*

Discussion.

Dr. A. L. NORTHROP. This is a subject upon which you cannot lay down an ironclad rule. There are conditions of the mouth where it would seem almost suicidal to extract, and other cases where it would be perfectly proper. It is a question that has been debated since I have been in practice, and I do not think it is nearer solution to-day than it was forty years ago. For a person to say that it is always proper to extract would be a mistake, and one who says it is never proper to extract also makes a mistake. In one case where I had extracted for a crowded condition of the mouth, almost from that day the jaw went on to develop, and I was sorry

*This paper is printed in full at page 866 of this issue.

I extracted. The cautious manner in which the paper is written is one which we can all accept and say "amen" to.

Dr. S. G. PERRY. I was not here at the beginning, so did not quite get the drift of the paper, but I heard enough of it to know in a general way what it was aiming at. It is a conservative paper, and takes a good position. I should rather express my feeling on the general question of the extraction of the first permanent molar, and I can say that as I grow older and have more experience I am less inclined to extract the first permanent molars than formerly. In the earlier years Dr. Clowes particularly was in the habit of extracting first permanent molars, and pretty indiscriminately. I was influenced considerably by him, and extracted many for which I have since been sorry. In these later years, when we have better means for saving first permanent molars by the aid of crowns, etc., I feel that a greater effort should be made to save them. Their loss makes a large vacancy in the jaw, and lets the front teeth tip back and the back teeth forward, and makes so deep a curve in the plane of occlusion of the teeth that it seems to me the mouth is not left in so natural and so good a position as it would be in cases where, if space is required, the bicuspid are removed. I am more inclined to take out the bicuspid, particularly if they are defective, than to take out the molars, because the molars are so large. The bicuspid seem to be a sort of compromise. The extraction of them gives space, but not too much. It leaves the jaw a little more like the natural jaw, and, after all, nature sets the natural type. With all our art, we cannot go beyond the natural art of the teeth.

After the extraction of the first permanent molars, for a few years there seems to be in many cases a real advantage. The teeth are not so closely in contact, and they seem to be saved somewhat from decay; but taking out these teeth allows an opportunity for movement of the other teeth, and a sort of scattering process begins. The teeth change their positions always, of course, in the line of least resistance, and some years afterward you will not always find them where you hoped to; sometimes with spaces here and there which are very annoying and very troublesome indeed from the lodgment of food, causing discomfort to the patient and causing most aggravating cases of decay, because by food lodging near the gum in these cases decay is encouraged to begin where it does not in cases where the teeth are naturally in contact.

In the molars, where decay generally begins near the grinding ends, with our modern means they can almost invariably be kept, and, the natural condition being retained, it leaves the teeth in such a condition that they are more safe from decay than if they are open and food gets between. It must be admitted that where the teeth move apart and allow free motion it saves the teeth from decay in a measure. This shows how difficult it is to discuss distinctly and clearly such conditions, because while I have in my mind a certain condition, it may be hard to convey to the hearer that condition; the hearer may have another condition in his mind. The real way to arrive at a just conclusion and make a fair comparison of our views is to see the model or the mouth; then we are all

entitled to express a definite opinion, and to some purpose. But to say "extract the molars" or "save them" in a general way is rather talking in the air. It is not definite or distinct enough.

I do think it is necessary to keep the line of articulation straight as nearly as possible.

The gain from the extraction of the first permanent molars may be even greater in the first few years than later in life. I have seen some cases, past middle age and in old age, where harm had been done, because spaces would be found and the real articulation of the teeth had been disturbed so that they were not like natural teeth. I have felt that in my own mouth, from the lower jaw of which were taken out two first permanent molars, leaving spaces on each side which have been more or less annoying, but more particularly the extraction of a lateral when I was a youngster, early enough to allow the other teeth to move and fill up the space, and which would perhaps be considered a good result; and yet it was not a good result, because every year, as I grow older, the front teeth are a great annoyance. They do not stand in their natural position; a toothpick must constantly be used, and there is one space which is a perpetual annoyance because it constantly catches food. If the first permanent molars and the lateral had been kept, and the teeth kept in their natural position, that trouble would not have occurred. In many cases of middle age and old age I have seen that. I feel every year the greater need of strict care of the relationship of two adjoining teeth. Nature made them to stand together and brace each other up, so the gum should be protected; and if the natural position can be retained, I believe that is the best our art can do at the present day. In many of these cases where in years gone by we might have been justified in extracting the first permanent molars where they were frail and badly decayed and there was little promise of keeping them to old age, by the use of crowns, etc., they now can be saved quite easily; and see what can be done for the articulation!

I believe that the correct juxtaposition of the teeth and correct articulation of the teeth is the best way of keeping them from caries; then if they decay, fill them so they are still tight together and locked together for all time, and try to keep them so the toothpick or floss or quill will not need to be used for the dislodgment of food.

I had occasion to see a very celebrated man use a toothpick at the table, and in trying to hide his use of it he put his napkin to his mouth; but he could not disclose the fact more completely, because it called the attention of all at the table that he was picking his teeth. That taught the old lesson that there was a space made either by decay or by the extraction of the molars or some other teeth, an unnatural condition, on account of which a toothpick had to be used. It is the office of the dentist to maintain the natural teeth; therefore, when it can be done, save the first permanent molars. I do not say save them at all times. It is unsafe to ride a hobby. On general principles, it will be safer for the younger men to be very guarded in the wholesale extraction of the molars;

and if they do extract, if it is possible let them extract so there will be a symmetrical development of the teeth, and by that means, if the molars are extracted at the right time, a little before the second permanent molars come in, they may encourage the development so the teeth will stand together, and in that way there may not be so much harm done.

Dr. LOUIS C. LEROY. I would like to add a few words to the paper of our late worthy member, Dr. Tenison. He is still fresh in my memory, and to-night I feel his loss more keenly than at any other time.

There are a few conditions in which, from my point of view, the extraction of first permanent molars is advisable, and that is where fevers have attacked children early in life and have interfered with the development of the proper calcification of those teeth. I say that wittingly, because of conditions present in the mouths—particularly one—of my two children. Both are under the age where I feel inclined to extract, but the time is coming when those teeth will have to be taken out. The first permanent molars are defective in both children. In the boy, who is more hardy and also older than his sister, there is less destruction; but in the girl, whose dental organs were not quite so well advanced in construction, the development was impaired more and the damage greater. I think in those cases we are justified in extraction, but I think, too, there is a time when it might best be done. Rather than prescribe the eleventh year, I think I will, in the daughter's case, extract those teeth very soon after the eruption of the second bicuspid. There may be some salvation for the boy's molars. That will bring it at a time when the second permanent molars will have an opportunity of following in the line of the first permanent molars better than at any other time, it appears to me.

As to the general extraction of the first permanent molars, let me cite again a clinical case. I am averse to it, owing to the serious defect brought about in my own mouth, due to the extraction of three first permanent molars. My father has always been identified with dentistry, and he thought he was doing me wonderful good in placing me in the hands of those whom he considered the better operators of our profession. What they accomplished for me was and may be regarded still by some as good practice. Be that as it may, it was practice that instituted the defect. I am minus the first permanent molars, and am also minus proper masticating power. The malposed teeth are not susceptible of contour. They are too wide apart, and are not even susceptible of proper regulation. The lower incisors occlude back of the upper incisors grossly abnormally. I think models of my mouth would be quite an addition to Dr. Tenison's collection, and some day I may think seriously of adding them to it.

Adjourned.

B. C. NASH, *Secretary*.

SEVENTH DISTRICT DENTAL SOCIETY OF THE STATE OF NEW YORK.

(Continued from page 670.)

FIRST DAY—*Afternoon Session* (continued).

THE following paper was then read by Dr. I. C. EDINGTON, of Rochester:

SECRECTIONS OF THE MOUTH DURING PREGNANCY.

I think we as dentists have assumed a great deal in regard to the secretions of the mouth during pregnancy. I believe the general impression prevails that the saliva is acid during this period, probably because we see such rapid caries of the teeth in some patients. The old saying is, "For every child a tooth," and we accept the condition and do the best we can with the disease, without looking for the cause; and, as the theory is accepted that it is acid which starts the decay, our ground seems tenable.

If the saliva is acid during pregnancy, *why*, and where does the acid come from? Is the saliva acid when it is emptied into the buccal cavity, or is the acid produced elsewhere? How does the acid get into the mouth, if it is there? Do the teeth really decay more rapidly during pregnancy, or are they more liable to caries during that period? These are some of the questions that have presented themselves to me. I have not had the pleasure of watching many cases of gestation since this subject has been under consideration, but have asked many questions, and had hoped to be able to present a history of a number of cases, but have failed to find the subjects. The literature is extremely meager upon this matter. The nearest thing I find is an article in the DENTAL COSMOS of April, 1895, by Dr. Peterson, of Grand Rapids, Mich., which is well worth careful reading.

I think it best to look briefly, for comparison, at the normal condition of some of the secretions and the blood. I include the blood because it is from the blood we get our secretions.

The process of *secretion* consists in the separation of materials from the blood, which are either to be again utilized to fulfill some special purpose in the economy or are to be removed from the body as excrementitious matter. In the former case, they constitute the secretions; in the latter, the excretions. The secretions are derived from the *nutritive* principles of the blood, and are elaborated by special organs,—gastric glands, mammary glands, salivary glands, etc. I will mention a few, with their reaction: *Mucus*, alkaline; *saliva*, alkaline; *gastric juice*, acid. There are about a dozen different secretions, but we will deal chiefly with those mentioned.

The blood is a nutritive fluid, containing all the necessary elements for the repair of the tissues of the body. It is a heterogeneous, opaque, red fluid, having an alkaline reaction and saline taste. The alkalinity of the blood depends upon the presence of alkaline sodium phosphates,— HNa_2PO_4 . Of the different elements entering into the composition of the blood, water is present in the largest percentage, and acts as a solvent. Albumin is the nutritive

principle. The saline constituents aid the process of osmosis, give alkalinity to the blood, promote the absorption of carbonic acid from the tissues into the blood, and hold other substances in solution, the most important of which are the sodium and potassium chlorids and the calcium and magnesium phosphates.

As the blood furnishes the supply for the secretions, the question arises, Does the blood remain alkaline during pregnancy? This seems important. As there is a greater flow of saliva during this period, if the source were acid, we could account for acid saliva.

"*Acidity*, literally the quality of being sour, is a term used in medicine to denote either (1) a quality of the normally acid fluids of the body; (2) a change in their character; (3) the alteration of a normally alkaline to that of an acid secretion. It may, then, be either physiological or pathological. We have several well-marked instances of the former in the gastric juice, the urine, the cutaneous excretions, and in the muciparous crypts of the mouth and vagina. The normal acidity of the cutaneous excretions is owing to the presence of some of the fatty acids of the acetic series. The acids of the buccal and vaginal mucous crypts are unknown."

The blood during life is *always* alkaline, but its *degree* of alkalinity may vary, being dependent upon (1) the amount of acid formed; (2) the amount of oxidizable matter furnished, and (3) the rate of elimination. The oxidation products of the foods and tissues form the principal source of the acids in the system.

In early pregnancy, the abundant flow of saliva will have to do with the decay of the teeth. If the patient is given to languor, there would be a lack of oxidation, hence more acid. As the whole economy is undergoing a change physiologically, there being a loss of red blood corpuscles and albumin,—the former as oxygen-carriers to the tissues,—with a greater amount of work for the heart, together with the liability to constipation which is very common, and therefore a lack of elimination, it is not to be wondered at if the patient feels languid.

Nausea and vomiting of pregnancy are due to spasmodic contraction of the stomach and diaphragm. The increased appetite in answer to the want of more nutrition, and the consequent overloading of the stomach, often brings on indigestion and sour stomach, with nausea and vomiting. However, I do not believe that has any direct effect on the teeth, as the acid thus brought in contact with them would naturally be rinsed away in washing the unpleasant taste from the mouth.

When ossification first begins, there is a change in the blood, due to absorption of lime from the blood to form the bone of the fetus. It is said not to affect the oral secretions. The reaction in some cases I have been enabled to record has been slightly acid in the morning and normal the remainder of the day.

I cannot look upon pregnancy as anything but the natural way of reproduction, and as such it must be normal; and if normal, it cannot be pathological; and if not pathological, how can the secretions be perverted to the degree of destroying useful organs? It is true we see many cases which seem to point to the pregnant condition as the cause; and I think it is, but indirectly.

Often we see a person fall from a bicycle, and nine times out of ten they will look the wheel over, get out the wrench and try to fix something, when the trouble is not with the wheel, but with the rider. So with tooth-decay during pregnancy. We lay the blame to the fact that the patient is pregnant, and console ourselves with the thought that she will be better when that period is passed. But I believe, from observation, the system may become overcharged with acid in virginity as well as in pregnancy. I would not lose sight of the fact that many who are pregnant are not in a normal condition, and they need our sympathy and best judgment, with the kindest treatment.

I am much disappointed at not having a long list of average cases with the condition and the reaction of the secretions. During the past six months I have talked with many who are mothers, and am glad to say that in the large majority of cases we found no symptoms that would cause us to think pregnancy had any deleterious effect on the secretions of the oral cavity, while the pregnant condition did in some cases cause an aversion to tooth-powder, and in some a special sensitiveness of the teeth, and therefore a lack of brushing.

If, as thought by some, decay is a disease, perhaps the condition of the secretions during pregnancy is such as to invite the special micro-organisms of caries to a banquet.

Litch says, in writing of the predisposition to caries, "Why is it that pregnant women become temporarily more susceptible to caries? Certainly not from any change in the structure of the teeth themselves, rendering their lime-salts more easy of solution by an acid. Of all the tissues of the body, the teeth are least prone to structural changes consequent upon variations in nutrition, and therefore are least liable to temporary susceptibility to disease on that account." I would call your special attention to "Morbid Conditions of the Fluids of the Mouth," by Dr. G. V. Black, page 774, vol. i, "American System of Dentistry."

In the absence of the real chemical tests of the secretions, I am unable to answer the main question at issue in regard to their reaction, and can only draw some general conclusions, hoping to have said something to draw attention to this subject and invite discussion.

So far as any acid in the secretions of the mouth is concerned, and its effect on the enamel of the teeth during the period of pregnancy, I think it improbable that it could be strong enough to play so much havoc as we generally suppose in so short a time. And, further, that the decay we observe at that time in many cases is really begun before conception.

I think the secretions are influenced to some extent, in some cases, by pregnancy, owing largely to the manner of life and habits in this and past generations. With the Roman conquest a great change took place. With the civilization then introduced came luxury and physical deterioration, but as the new woman approaches, methinks, conditions will change in dress and outdoor exercise, which I believe has much to do with their condition and the reaction of all

the secretions during pregnancy. As we inquire into cases, we find patients very lax in the use of the tooth-brush, and the almost universal habit of cleansing the teeth in the morning "because of the bad taste in the mouth." And why should it not be bad, when the interspaces are allowed to carry the accumulation of twelve to eighteen hours, with a suspension of nature's tooth-wash, the alkaline saliva, during the last six or eight hours?

From what I have been able to gather on this subject, I think the same influence will produce the same results in the system, regardless of virginity or pregnancy. I have in mind several cases which have come under my observation where the whole alimentary canal was deranged, and the most rapid kind of caries was present in the mouth, which seemed to defy all local treatment; but when the proper systemic treatment was employed marked improvement followed, and this in virgins. From all I could discover, the local conditions were the same as I had observed in pregnancy. A word in regard to the treatment of such cases, where there exists the condition of this particular kind of decay,—*i.e.*, very white decay: We may expect a derangement to a greater or less extent of the alimentary canal. By referring the patient to the family physician, the general health may be improved and the system toned up. A local treatment may be employed, as mouth-washes and temporary fillings. Of the former, milk of magnesia is preferable. As to the pregnant condition, as we sometimes see it to-day, a general hygienic course should be the rule. The child brought into the world without its own volition has some rights which we ought at least to respect; therefore, it has an inherent right to have a good constitution as a starting gift. The mother should take plenty of outdoor exercise, breathing in deeply the fresh air, that the blood may be properly oxidized; should take frequent sponge-baths with cold or very hot water, that the excretory matter may be eliminated; should wear loose clothing, that she may exercise freely, and nutritious food should be taken four or five times a day in moderation that she may not overload the stomach. The bowels should be free and regular, the kidneys active, and, in fact, all that makes up a good general physical condition; and I think we will find that the secretions of the mouth will not injure the teeth. I am also a firm believer in thorough cleansing of the teeth just before retiring, which will greatly lessen the decay of the teeth in all subjects. If there is one time more than another when the teeth should be cleaned, it is at night, and I think it wise to instruct patients to that end.

Discussion.

Dr. G. E. LOCKE, Brockport, said that the subject of the paper was one that merited more attention from the profession than it had received. There was very little in dental or medical literature on the subject.

It would be strange if the secretions of the mouth should be acid on account of pregnancy, as it is undoubtedly a normal and healthy condition in a normal woman, and there appears no reason that it should affect the secretions in any way. It is true that we find acid

conditions in the mouth during pregnancy, but not on account of it. In looking through his books, he could not find that he had more work to do for his lady patients during and subsequent to this period than he had before. The old saying, "A tooth for every child," finds wide acceptance with the people. As was stated, it is something like the bicycle rider who falls from his wheel, and on getting himself together examines the wheel carefully, gets out his wrench, and endeavors to find a bolt or nut that he can tighten up. He feels that the wheel is in fault or he would not have fallen, while in truth the fault is in himself. Just so if a neglected tooth begins to ache, the cause is thought to be pregnancy and not the neglect.

Dr. EDINGTON thought the bicycle illustration an apt one. The dentist sees as patients only such pregnant women as have trouble with their teeth, and if their teeth present the customary white decay, it is, of course, charged to their condition. We do not see the many whose teeth do not need attention, and the impression left on our minds is that every pregnant woman needs dental help during that time. However, when they do need attention, many of them require more consideration than they would at another time, and as a rule it is advisable to give only temporary treatment until this period is past. It is also well to prescribe an antacid mouthwash,—milk of magnesia, for instance. Too many mothers shut themselves up too closely in the house, and the lack of air and exercise brings on a lowered condition of the whole body, with probable derangement of the alimentary system, which is liable to cause the acid secretions of the mouth and white decay.

Dr. C. F. BOOTH, Canandaigua, said it was not safe, upon finding an acid condition of the mouth with the characteristic white decay, to take it for granted that the condition was due to pregnancy unless other signs were evident. Recently having such a case, he had intimated to the lady's husband that the condition of the teeth was due to the wife's pregnancy, and the husband assured him that "there was nothing in it."

The subject was passed, and the following paper, by EDMUND C. BODDY, M.D., Rochester, N. Y., was read:

LESIONS OF THE FIFTH PAIR OF NERVES.

Disease and injuries of the fifth or trifacial nerve are of important interest to the professions of dentistry and medicine alike; both are called upon at times to undertake treatment for painful affections of this nerve, and the members of the dental profession often-times see these conditions in their earlier stages, before the patient seeks relief from drugs or the surgical measures of a physician or surgeon. And often it is the happy lot of the dental surgeon, by the early recognition of the conditions that may be present, to effect relief and cure of this most distressing condition.

In diseases of the nervous system it is of the greatest importance to know accurately the position of the morbid process, and here, even more than in other departments of medicine, a thorough knowledge of the anatomy and physiology of the parts is essential. We will therefore briefly consider the anatomical origin, relation,

and distribution of the fifth nerve, that with this brief review we may refresh our knowledge and be enabled to better understand the measures of treatment instituted for the relief of these conditions.

The fifth nerve differs from the other cranial nerves in that it arises by two roots; that it has a ganglion developed on the posterior root, and that it carries motor and sensory impulses. In fact, it resembles somewhat a spinal nerve. It is the largest of the cranial nerves, and has perhaps the largest superficial distribution. The origin of the nerve is in many ways complex. It is perhaps sufficient to say that it has the deep origin of its sensory root from a nucleus on the level with the middle of the superior peduncle of the cerebellum near the margin of the fourth ventricle, and the deep origin of its motor root from the floor of the fourth ventricle. These two roots of the nerve pass forward through an opening in the dura on the upper border of the petrous portion of the temporal bone. Above the internal auditory meatus they run between the bone and the dura mater to the apex of the petrous portion of the temporal bone, where the fibers of the sensory root form a large ganglion,—the semilunar ganglion of Gasser, which is located in a depression near the apex of the petrous portion of the temporal bone, while the motor root passes beneath this ganglion and joins outside of the cranial cavity with the inferior maxillary nerve, one of the divisions of the sensory root which is given off from the Gasserian ganglion. The ganglion gives off three large branches,—the first, or ophthalmic; the second, or superior maxillary, and the third, or inferior maxillary. The ophthalmic and superior maxillary nerves are solely nerves of common sensation, while the inferior maxillary division, since it receives the motor root, carries impulses of sensation and motion.

The first, or ophthalmic, division of the fifth nerve leaves the cranial cavity by way of the sphenoidal fissure into the orbit; it supplies the eyeball, the lacrymal gland, the mucous lining of the eye and nasal fossæ, and the integument of the eyebrow, forehead, and nose.

The second, or superior maxillary nerve, leaves the cranium through the foramen rotundum, crosses the speno-maxillary fossæ, and enters the orbit through the speno-maxillary fissure, transverses the infraorbital canal in the floor of the orbit, and appears on the face at the infraorbital foramen or notch. It supplies with its branches the dura mater of the brain, the mucous membrane of the mouth, gums, palate, tonsils, uvula, of the upper part of the pharynx, and the lining membrane of the nose; the teeth of the upper jaw, the skin of the temples, side of the forehead and cheeks, the side of the nose, and the lower lid of the eyes.

The third, or inferior maxillary nerve, is made up of two roots,—a motor and a sensory, which join together just after they have left the cavity of the cranium through the foramen ovale. This nerve gives branches to the teeth, the gums of the lower jaw, the integument of the temple and external ear, the lower part of the face and lower lip, and the muscles of mastication. It also sends a large branch to the tongue.

The nerve may be the seat of local injuries somewhere in its course, or at its origin. At the pons near its nucleus it may be due to hemorrhage or spots of sclerosis. Again, injury or disease may attend it anywhere in its course. Injuries or disease at the base of the skull, especially acute and chronic meningitis, caries of the bone, tumors, syphilis, new formations of any sort compressing the nerve trunk or at the ganglion of Gasser, sometimes in rare instances fracture of the base of the skull, may affect it.

The nerve itself may sometimes, although very rarely, be the seat of a primary neuritis. These lesions of the nerve are those in which there may be some structural change in its substance, or are due to injury or new growth somewhere in its course. But we now come to that condition in which there is no such change, or, at least, it has never been demonstrated. I mean those cases which we term neuralgias, *tic douloureux*, *prosopalgia*, etc. Strictly speaking, the term neuralgia should be restricted to such varieties of nerve pain as are unattended with structural changes in the nerve.

Formerly many cases that we now regard as cases of neuritis were called neuralgias. It is a term, like rheumatism, used to cover a number of conditions which, strictly speaking, we do not know the exact cause of, or at least we are unable to demonstrate; but as our knowledge of the condition grows, and as a result of the careful scientific research of to-day, it is probable that many other so-called neuralgias will be limited and the term restricted to nerve pain without organic change, and it may perhaps be dropped altogether.

Finally, the border-line existing between neuralgia and neuritis cannot be too sharply drawn, as one condition at times may shade into the other.

Neuralgia of the fifth nerve is a disease of adult life; it very rarely occurs in young children before puberty, and then is an accompaniment of the neuritis due to the acute infectious diseases, as scarlet fever, diphtheria, and the like. It also rarely occurs in old age; it is found more commonly in women than in men.

Heredity is responsible for a tendency to neuralgia. Members of neuropathic families are most subject to the disease. It is prone to occur in the so-called nervous person,—one who is of an easily excitable, anxious, and worrying disposition. It is often the first indication of an enfeebled nervous system. The poorly fed, overworked, anemic, debilitated, are perhaps the most frequent sufferers from this trouble. Exposure to cold and wet while the body suffers from some debilitating condition frequently precipitates an attack, especially in a nervous person. With an heredity taint, reflex irritation from carious teeth may induce a neuralgia, while the pain of a carious tooth is not regarded as neuralgic. When such a pain causes irritation of the peripheral branches of the fifth nerve, a neuralgia may be produced in the distal distribution. A neuralgia may be the prominent feature at the onset of certain acute diseases, particularly typhoid. Malaria was believed to be a potent cause, but it has since been shown that the neuralgia may depend more upon the general debility accompanying the disease

than to the specific poison of the malarial organisms and to the periodicity of neuralgia, and it can further be said that neuralgia is no more frequent in districts known to be malarial than elsewhere.

Rheumatism, gout, diabetes, syphilis, chronic nephritis, alcohol and tobacco, and lead poisoning are sometimes causative factors in the disease. The essential cause of trifacial neuralgia is too often either hypothetical or is absolutely unknown. It very often occurs with no assignable cause whatever in an individual of good personal and family history. Spontaneous spasmodic pain is the chief symptom; its location depends upon which branches of the nerve are involved. Sometimes, although not very frequently, all these branches are affected. The pain is that which is independent of a neuritis or irritation of the nerve, although this cannot be so easily separated. Pressure of gentle friction usually relieves this, while in nerve inflammation or irritation the pressure incites pain; yet literally this is not so, for in some neuralgias we observe frequently "tender points." The pain is described as irregular, paroxysmal, shooting, darting, or burning in character, with multiple dartings and shootings separated by seconds or minutes of freedom from pain.

Pain, with the modifications to which it is subjected in severity and distribution, constitutes in fact the disease. At first there is no tenderness along the nerve trunks or at points of emergence from the bony canals, but after the pain has continued for some time there often succeeds tenderness. At these points, as well as along the course of the nerve and at its final distribution, the skin becomes sensitive, tender to the touch, even at times accompanied with swelling and redness; these are accompanied with evidence of vaso-motor interference in the area of distribution, edematous swelling, increased and localized sweating, local elevations of surface temperature, increase in the flow of saliva and tears.

The difference in the parts involved will depend upon the branch of the nerve affected.

The first, or ophthalmic, is perhaps the most frequently involved. This gives rise to the well-known and more or less frequently met supraorbital neuralgia. The pain radiates from the tender point at the supraorbital notch over the anterior half of the head to the eye and eyelid and lateral aspect of the nose. The conjunctiva itself becomes injected and suffused, and is painful. The pain is sometimes referred to the occipital protuberances and along the spinous process of the cervical vertebræ.

When the superior maxillary division becomes involved, the pain is especially marked along the teeth of the upper jaw and the gingival border. These are the so-called tender points at the infra-orbital foramen, where the nerve emerges on the face and sometimes along the side of the nose and along the malar eminence. When there is involvement of the third or inferior maxillary branch, there is a much more extensive area of pain; and, as this occurs but very seldom as an isolated form, but is usually associated with that of the second division, it involves practically the whole of one side of the face; with the exception of a very common form of neural-

gia which affects the inferior dental branch alone, at least it begins as such, but rapidly invades other branches and becomes more or less general. In this form the patients refuse to take nourishment or to talk, as almost every motion of the jaws in mastication or speaking causes intense paroxysms of pain. Sometimes, especially in the involvement of the superior maxilla, the patient would rather be kept in a darkened, closed room, as every effort to look toward the light, or even raising the eyelids or drinking causes the most intensely excruciating pain. A tender point is usually found in front of the ear where the auriculo-temporal branch crosses the zygomatic arch. An herpetic eruption is occasionally present about the eye or lips. Twitching of the muscles or even localized spasms are often present during the paroxysms. The attacks last a variable time, from a few minutes to many hours. It may recur at definite intervals; sometimes every day at the same hour, or at intervals of one or several days. There is a form of trifacial neuralgia termed epileptiform, which consists of sudden, severe, and frequent paroxysms of pain, of a jumping nature, lasting from a few seconds to a few minutes. These attacks may be repeated in the day. Some forms of trifacial neuralgia are of frightful intensity, and the recurring attacks render the patient's life almost unbearable.

The treatment of *tic douloureux* may most properly be divided into that of the acute paroxysm and that of the etiological factors predisposing to it: these should be carefully sought for and corrected. The anemias, especially chlorosis, should be corrected with tonics. Iron, arsenic, strychnin, cod-liver oil, and phosphorus are especially advantageous; malaria with quinin, although the value of quinin has been much overrated. It probably has no more influence than any other bitter tonic, except in those cases in which the neuralgia is definitely associated with malarial poisoning. In gouty or rheumatic subjects *cannabis indica*, *cimicifuga*, lithium salts, and salicylates find their use. The causes of reflex irritation should be carefully removed. The removal of carious teeth should be accomplished, although this is almost uniformly useless except early in cases which seem to arise from such a source; but the trouble soon passes beyond the point where such a procedure will check it, and some writers condemn this procedure vigorously.

Servill, writing in the *British Medical Journal* of January 16, 1897, reports two cases of trigeminal neuralgia which he considers due to the loss of teeth. He found that, all the teeth being gone, the approximation of the jaws put the maxillary articulation in an abnormal position, and perhaps served to make traction on the inferior maxillary branch of the fifth nerve. In both of his cases the neuralgia was confined to the branches of this division, and relief was given by introducing the proper dental plates; and the condition could be reproduced by having them removed a few days.

After all, it is but just that this should be done, for we may thereby remove the primary source of irritation; but it should always be accompanied by other vigorous treatment. Careful attention to diet and general hygienic measures are of importance; change of scene and residence, with an outdoor life and plenty of

exercise, such as a residence in the mountains, often do much for the general conditions.

In the treatment of the paroxysm, anodynes find their use, and their beneficial influences are sometimes more than palliative, for the repeated removal of the pain tends to prevent its recurrence. Among the most useful of these are those drugs derived from the coal-tar group, phenacetin, acetanilid, antipyrin, and the like. The usefulness of morphin cannot be denied, although its use, as well as that of cocain, is to be avoided, as the danger of the patient's forming a habit is extremely great; this applies equally as well to the use of alcohol, which is at times valuable.

Nitro-glycerin, gelsemium, and aconite have enjoyed quite a reputation in the treatment of tic douloureux, some writers claiming their action to be almost specific, but the consensus of opinion seems to be the reverse. Local applications are in most cases worse than useless, but at times they may be used as aids in the general treatment. Local anesthetics, such as menthol, chloral, chloroform liniment, belladonna, freezing over the course of the nerve and tender point, local applications of the thermo-cautery, and electricity are at times useful, as well as the local use of hypodermic injection of cocain, carbolic acid, and osmic acid.

Heat is usually more efficient than cold, though ice-bags are used with some patients. Electricity is of uncertain value in neuralgia of the fifth nerve. Experience goes to show that the direction of the current may be ignored. The constant current is the form most frequently used, but faradism with rapid interruptions may be tried. That many cases of trifacial neuralgia can be cured by medicinal treatment alone I am in doubt, but it is certain that some may, and it is always to be tried. This is not said in opposition to the proper employment of such means and for a proper time, but to emphasize the fact that from ignorance of causation there results an impossibility of definite therapeusis,—the tentative shifting from one plan to another. These patients are often broken down in general health, and not infrequently are the subjects of morphin or cocain habit when they present themselves for surgical interference. The surgical treatment of this condition has often been followed by brilliant results, and, it is true, also by signal failures. Many writers have sought to classify their cases into those applicable to medical treatment and those demanding surgical interference; but this has been accepted by but a few, and it seems but just to the patient to lean to the side of conservatism. Surgeons must accordingly accept the first period as one rightfully belonging to the domain of medicine. How long this period is to continue is a matter for much thought and study of the individual cases; in a general way we may regard cases of trifacial neuralgia which have resisted medicinal measures for from six months to a year—the time varying in inverse proportion to the severity of the attack and in direct proportion to the length of the remissions—as requiring surgical interference.

Surgical operations for the relief of trifacial neuralgia may be divided into *peripheral*, which include neurectasy or nerve-stretch-

ing, resection or neurotomy, and neurectomy or exsection, and *intercranial*, including removal of the Gasserian ganglion. The peripheral operations are applicable to neuralgia of the second and third divisions of the nerve, particularly the former, as the pain is apt to be limited to those divisions and as the peripheral operations upon them are attended with less risk than accompanies the intercranial procedure. The evidence that such operations are followed by good results in some cases is unmistakable. Of course, in a disease of so uncertain an origin and so erratic a course attended with remissions of such a variable length, absolute cure cannot be predicted for many years. It is borne out by statistics of such operations that if we could classify our cases properly and could clearly distinguish those cases due to central disease there would be a large field among those due to other causes for the peripheral operations. It may also be said that in cases where the pain is limited to one branch the minor operations, like neurectomy of the inferior dental or infraorbital nerve, will occasionally cure, or at least give as long a remission as the more severe operative procedures; and it is probable even to-day, with our modern aseptic operations, that the patient and surgeon will prefer the mild operations, even with the knowledge that a permanent cure is by them not absolutely certain. In some cases in which either from the beginning there has been an excessively wide distribution of the pain, so that all these divisions are involved, and in which the pain is of great severity or in which the peripheral operations have been tried and the condition returned, the intercranial operations may be selected.

In choosing such an operation the surgeon will be obliged to decide which route he will take to remove the ganglion. Several have been advanced. That which bears the name of pterygoid, advanced by William Rose, an English surgeon, is from below through the base of the skull; after a resection of the zygoma and some part of the lower jaw attaching the nerve at the foramen ovale, trephining through the base of the skull at this point, and pulling down the nerve and ganglion at this point. The other route is the so-called temporal route, advanced by Hartley and Krause, which consists in a horseshoe-shaped flap above the zygomatic arch down to and including the bone, which is turned down and broken off, leaving it attached, however, to the skin flap. The dura is not opened, but the brain is lifted up, and the nerve and ganglion is cut off and pulled out as it lies in a depression in the petrous portion of the temporal bone.

The temporal route perhaps possesses certain advantages over the pterygoid; the incision is shorter, little muscle is divided, and the scar is hidden in the scalp by the hair. The ganglion can be exposed with little risk of opening the sub-arachnoid space, and there is no danger of opening the Eustachian tube. The objections to the pterygoid route are the disfiguring scar upon the face; there is difficulty in finding the foramen ovale; the internal carotid artery may be damaged; the ganglion cannot be thoroughly exposed, as in the temporal route, and only portions may be taken away,—and in some cases necrosis of the zygoma have followed.

Whichever route is chosen, and both are difficult enough, the great danger is that we cannot ever be sure that we have accomplished our object,—removal of the Gasserian ganglion; for even by the improved methods the blood wells up into the field of operation, and the surgeon will be obliged to trust to the sense of feeling, as, aside from the bleeding, a good light is difficult to obtain, and the space to work in is necessarily very small.

The following history is that of a case of trifacial neuralgia which is not unusual, except that her attacks seemed associated with pregnancy, or at least were aggravated by it, and occurred in a person of good family history. The case occurred in the practice of Dr. H. T. Williams, of Rochester, N. Y., to whose kindness I am indebted for permission to report:

Mrs. M., born in the United States, thirty-eight years of age, married housewife, wife of a farmer. Her father died of old age; mother is alive and well. Three brothers died in infancy; two brothers and two sisters alive and well. Has three children, ages two, seven, and ten years. Patient had measles when eight years old. Menstruated at the age of sixteen years; always regular, of three or four days' duration, and not painful. Had an attack of quinsv in her fourteenth year, and again in the fifteenth year. Has had a light leucorrhea since her first child was born. Also had what she called childbed fever when her first child was born, and was sick a number of weeks.

The first date of her present trouble was about two months before her first child was born, about ten years ago. She suffered with intense pain, involving the lower half of the right side of the face. The pain disappeared for about a year and a half after the birth of the first child, and then came back during the time of her second pregnancy. Was operated upon in 1893; has a scar on right side of face along the margin of the inferior maxillary bone. She says at this time the surgeon told her he divided the nerves. This operation gave her relief for about four months. In the fall of 1894 she was again operated on in the same place, the pain having returned. This time there was no relief. Then followed a period in which she tried taking almost every drug which could have any bearing on the case, including quite large doses of morphin.

In 1896 she again submitted to operative measures in about the same place and manner, each time the surgeon going a little farther and resecting more and more of the nerves. At this time she had all of her teeth removed. This time there was no relief whatever.

About a year after this she again became pregnant, and, curiously enough, the pain disappeared until she had been pregnant about the third or fourth month, this differing from the other pregnancies, and the pain then returned. This attack was the most severe she had experienced. She was obliged to make an invalid of herself and keep to her bed most of the time. She was unable to chew or swallow solid food or open her mouth very wide, and was obliged to take liquid nourishment most of the time with a feeding-tube.

She entered the city hospital on August 11, 1899. I neglected

to state in the previous history that she had a deflected septum nasi. This was operated upon and corrected, as it was thought possible that this might act reflexly as an irritation and keep up the neuralgia; but she experienced no relief from this procedure, so on August 30, 1899, she was again subjected to an operation. An S-shaped incision was made in the scalp in the temporal region above the zygoma, a flap of bone chiseled through and turned up, the temporal sphenoidal lobe was lifted up and the nerves divided. The ganglion was not located; the blood welled up into the field of operation, and it seemed advisable to pack the wound and close it partially. She experienced no relief from this, and, indeed, it was hardly expected. So now, September 2d, the patient was again placed on the operating table, the old incision of a few days before opened up and enlarged, the old button of bone turned up and a corresponding button turned down. This was done so as to enlarge the field and enable us to work with more ease. The Gasserian ganglion was recognized this time without difficulty, and it was entirely scraped, and, together with about a quarter of an inch of the nerves, a probe was passed through the foramen and the nerves thoroughly destroyed.

The buttons of bone were displaced from the skin-flaps and fell on the floor. They were picked up and placed in normal salt solution until the conclusion of the operation, when they were replaced, and united firmly in two weeks without suppuration. The skin wound healed nicely, and the patient left the hospital eighteen days after the operation. She has been entirely free from pain since that time, now almost two years. She is able to eat solid food, and has resumed her usual household duties.

At the time of the operation she was a physical wreck, and she has since regained her strength and health and has left off her old drug habit.

Discussion.

Dr. R. H. HOFHEINZ, who had promised to open the discussion on this paper, was not present, but the chairman of the Business Committee read a letter from him in which he said:

"I am extremely sorry to be unable to be with you and discuss Dr. Boddy's paper, as I had expected and prepared to do. The paper is both able and very opportune. True it is that the complexity of the origin of the fifth pair of nerves is only surpassed by the complexities of the troubles it produces. In addition to the numerous pains Dr. Boddy's paper speaks of, I was prepared to add sixteen specific dental causes which father some of the troubles of the fifth pair of nerves.

"I have always held it to be the primary duty of the physician to refer his patients to the dental specialist whenever he finds any expression of pain from the fifth pair of nerves. If after careful dental examinations none of the above causes is to be found, the medical practitioner may begin his treatment. It would be difficult to furnish better proofs to establish the close relationship of medicine and dentistry than Dr. Boddy's excellent paper has given us. With all due regard to our special and technical and operative

education, the inseparableness of medicine and dentistry as a science is never better illustrated than by such a paper as the society has had the pleasure of listening to."

Dr. WALLACE HERRIMAN, Rochester, said that the subject of the paper was so broad and full that volumes might be written without exhausting the theme, but the dentist's interest is principally in the lesions of the second and third branches, the superior and inferior maxillary branches. The first duty of a physician when called upon to treat a neuralgia or other pain of the head or face is to examine the region thoroughly in the effort to locate or determine the cause. This examination should begin with the top of the head and proceed downward till we get to the teeth, and here the examination should be very thorough, though the result may not always be conclusive. We may find teeth that are carious, and have them properly treated, and yet not touch the cause of the neuralgic pain.

Malaria, fatigue, excessive venery, eye-strain, alcoholism, diabetes, and gripe are all potent factors in the causation of neuralgias. In recent years malaria is not so frequently blamed as in former times. Nevertheless patients will come to him suffering with neuralgia and, if no other cause is found, get a big dose of quinin.

In regard to operations on the nerve: With the improvements of modern surgery, mortality from operations becomes less and less, the operations more and more successful, and the results better. Krause reports twenty-four operations on the Gasserian ganglion with twenty-four recoveries. The injection of osmic acid into the nerve trunk is very successful in the hands of some. Dercum, following in the footsteps of S. Weir Mitchell, favors putting the patient in bed, with absolute rest, forced feeding, and hypodermic injections of strychnin.

It was impossible for him to give the treatment of facial neuralgia from the special standpoint of the dentist.

(To be continued.)

UNION MEETING OF THE DISTRICT OF COLUMBIA DENTAL SOCIETY AND THE MARYLAND STATE DENTAL ASSOCIATION.

(Continued from page 799.)

A PAPER entitled "Some Phases of Oral Hygiene" was then read by Dr. LEVI C. TAYLOR, Hartford, Conn.*

Discussion.

Dr. B. HOLLY SMITH said that the paper indicated clearly the direction in which improvement in dental practice is most necessary. We know how to fill teeth and yet we do not stop decay. We know how to treat pyorrhea as we have been taught to treat it, but we do not know how to cure it, and this, which we need to know, such papers as this will teach us.

The teeth of an animal, a dog for instance, upon examination will generally be found sound, complete, and clean, and will last the natural life of the animal, giving good service, while the ills that

*Printed in full at page 877 of this issue.

man's teeth are heir to are too well known here to require mention. What is the matter? are men, then, retrogrades in a physical sense? are we less perfect physically than the dog?

We have made the mistake that we do not clean the mouth and teeth as we should. We should clean them perfectly and keep them clean. This is the teaching that will lead us forward and make us what we should be, that is, tooth-savers, rather than tooth-menders.

Dr. C. C. HARRIS said that while Dr. Taylor had dwelt upon the matter of prophylaxis he said little, if anything, of what the patient should do between the treatments by the dentist. How often should the teeth be brushed, and what kind of a brush is the best? He recommended a brush which had bristles cut rounded from side to side of the brush, so that, when rubbing the teeth, a square edge would not rub and wound the gum. If the brush is such that it will hurt the gum, the patient will not be willing to use it, and the teeth will be neglected. If the gum bleeds under the brush, it is because it is inflamed, and a continued brushing will cure the condition in a few days.

Dr. TAYLOR said this method of treatment would solve the question of painless dentistry, and it is better thus to take the teeth and preserve them as they can be preserved by this treatment, than to let them go until they are decayed and then fill them. We hear a great deal about "painless dentistry," but this is the real painless dentistry, and in this practice there is no danger of cocain poisoning nor of infection from septic hypodermic needles.

Dr. B. HOLLY SMITH quoted from Kipling:

O East is East and West is West, and never the twain shall meet
Till earth and sky meet presently at God's great judgment seat;
But there is neither East nor West, border nor breed nor birth,
When two strong men stand face to face, though they come from
the ends of the earth.

And so it was with him and Dr. Taylor. Taylor was from Massachusetts and he was of Baltimore, but when Dr. Taylor brought truth and opened it up to them it was received with all hearty welcome, and this is such a truth. He spoke of the sensitiveness of teeth being caused by the accumulation of tartar, and told of a patient who was so nervous that he had her use bicarbonate of soda to wash her mouth every day, and when she could she would go to him and he would clean her teeth, one at a time, sometimes only one tooth a week. Keeping this treatment up, the sensitiveness all disappeared and the teeth and gums are now in a beautiful condition, and her general condition very much improved.

On motion, a rising vote of thanks was given Dr. Taylor for his paper, and the convention adjourned, to meet at 9 A.M. next day.

SECOND DAY—*Morning Session.*

The convention was called to order at 10 A.M., and the following paper was read by HENRY B. NOBLE, D.D.S., Washington, D. C.:

REGULATING BY THE JACKSON SYSTEM.

Much has been said and written upon the correction of irregular teeth, and, judging by the publications, with the illustrations and

drawings, that appear in the dental journals, there is a vast amount of ignorance as to the best forms of appliances and fixtures, many of those used being so complicated and cumbersome as to severely tax the powers of endurance of the boy or girl on whom they are applied. Orthodontia is a specialty that needs careful study and experience to accomplish the best results. I am sure the teaching of some of those who are supposed to be leaders and teachers, and who are considered standard authorities, has caused a vast amount of unnecessary suffering on the part of patients, and worry and disappointment on the part of those who have adopted these costly and complicated fixtures.

I believe the Jackson system to be better than any other given to the profession, and adapted to a larger number of cases. Its superiority consists in its simplicity and ease of construction; its firmness when in place; its being less annoying to the wearer; its ease of removal and cleansing even by the wearer, and in its needing no stay-plate when the work is done, as it can be worn by the patient at night without the least annoyance as long as there is any disposition of the teeth to go back to their irregular positions.

The appliances should be made of platinoid wire, both crib and spring; we usually use soft solder, but hard solder can be used if desired. Gold spring wire, instead of platinoid, can be used if preferred, especially where the springs are exposed on or about front teeth, and with a little care in soldering the temper of the spring gold wire can be maintained. Before the use of platinoid, piano wire was used where stiffness was required, but it was more difficult to solder; also it turned black and discolored the teeth. We find platinoid answers all purposes. I find that beginners in the use of this system are inclined to use too heavy a wire for the springs and too small a wire for the U-shaped base wire.

Dr. Jackson recommends cribbing several teeth where firmness is desired and where short oval teeth render the plate insecure, but I have found a small clasp or lug on the bicuspid (as we usually use the molars as a base) will do the work better than a full crib. To open the bite, a little solder can be dropped on the wire so as to rest on the crown of the tooth where the anchorage is made.

My opinion, based upon years of observation, is that all but the simpler cases of irregularity should be referred to the hands of the specialist, both for the good of the patient and the uplifting of the profession.

I hear it often said the use of this system does not pay, which is quite contrary to my experience, as the fixture is so simple of construction that after a little practice it can be quickly made and adjusted, and it is so easily cared for that intelligent patients remove and cleanse it themselves.

I wish to emphasize a few points necessary for success: First, a good impression; I take nearly all of mine with modeling compound. Second, it is necessary to have the crib and spring on the anchor tooth grasp the tooth firmly at four points. The ends of the inside crib are apt to be rounded off too much; they should be left so they can be bent or tightened if necessary. Third, there

should be a clasp or lug on one or more teeth besides the anchor tooth, as the fixture must be firm and secure. We must have absolute control of and be in harmony with the patients. The younger the patients the more easily the teeth move. I have regulated several front teeth with anchorages on temporary molars. Another important thing of my own invention is to hold the springs in place while soldering by the use of common pins stuck or driven into the plaster so as to keep them from slipping or moving.

Dr. Noble passed several models of cases around to show the methods of applying the system and the results gained by its use.

Discussion.

Dr. M. C. SMITH, Lynn, Mass., spoke of his experience in the correction of irregularities. He said he had a number of such cases as Dr. Noble described, and it was not necessary in more than one-fifth of them to have the patient wear retaining appliances to keep the teeth in place. He always insists upon an examination for adenoid growths in the post-nasal region, and their removal before he undertakes the correction of the irregularities. He considers the presence of the adenoids in a very great proportion of the cases the cause of the irregularity, and if they are removed and the breathing corrected there will be little if any reason to fear the return of the teeth to their wrong positions.

Sometimes the patient, or the parents of the patient, will refuse to have the operation for the removal of the adenoids. In such cases the irregularity will return unless the retaining device is worn. One of his patients who refused this operation has worn the retaining device for four years, and is still wearing it. Dentists who attempt to correct irregularities of the teeth must learn that if the cause which brought on the trouble continues, the trouble will recur, and if their operation is to succeed the cause must be removed and the patients must be able to breathe naturally through the nostrils, and must acquire the habit of so breathing. In almost all cases where the retaining appliances have to be worn for a long time, the patient is still a mouth-breather.

Dr. COGAN, of Washington, asked if all cases of dental irregularity were caused by faulty breathing.

Dr. SMITH said they were; or at least in his experience the two were always associated.

Dr. NOBLE said he had been considerably enlightened at this meeting, and would study the subject of adenoids more carefully than he had in the past. He did not want to speak too confidently, but thought he could say that in at least some of his cases there was no fault in the breathing.

The subject was passed, and the following paper was read by Dr. JOSEPH ROACH, Baltimore, Md.:

IRREGULARITIES BENEFITED BY THE EXTRACTION OF THE "SIXTH-YEAR MOLARS."

Mr. President and Gentlemen,—Several years ago I wrote a paper advocating in most cases the extraction of the first permanent

molars of children between the ages of nine and ten or ten and eleven, according to the precocity of the child.

I find that it is almost impossible to make parents realize the importance of early and constant attention to the teeth of children. And when they do realize it, what a difficult thing it is to get the nurse or attendant properly to clean the teeth! Sometimes children are eight or ten years old before they are put in the care of a good operator. The want of cleaning and preserving the deciduous teeth frequently causes much damage to the molars. I have in mind many children not seen by me until the pulps of the first permanent molars were exposed, and many cases where they were so nearly exposed that it was impossible to save the teeth.

Again, in my observation during my practice I have noticed that in the majority of American children the teeth, both upper and lower, are generally crowded and afford facility for decay.

But I do not intend to go into details; I will merely give you a short paper, and show you the results of extracting the first permanent molars.

I have several patients in whom irregularities were almost entirely corrected and the teeth wonderfully improved.

Here is a model, which I mark No. 1. The teeth were badly crowded and constantly decaying. I tried for years before I could persuade the parents to have the four permanent first molars extracted. When I at last succeeded the patient was fourteen years old. He is now eighteen. His teeth, with the exception of the upper right lateral, are in fairly good position; decay is not frequent in the teeth, and they are much bettered by the removal of the molars. You see that the lower third molars are just through, and are well developed; the upper ones are beginning to erupt, and promise to make fine, useful molars.

Model No. 2, which you here see, shows distinctly that the teeth are well spaced and in very good shape. This case is a young lady of twenty-two years. I extracted the permanent first molars twelve years ago, and I am sure it was the best thing I could possibly have done. The teeth have not decayed so much since then, and I am satisfied that she will have good teeth during her life.

Models No. 3 and No. 4 I present to you as the best proof of my theory for extracting the first molars. The patients are sisters, twenty-two and thirty-two years of age respectively.

In No. 4 the molars were not extracted, leaving a crowded condition. Notwithstanding close examination and constant care, her teeth were persistent in decaying and the loss of teeth great. In the upper denture, the centrals now have large approximal and distal cavity fillings; on the right side there is a bridge suspended from a dead third molar and a dead root of the first bicuspid; the right central and lateral are Richmond pivots; the left lateral I cut off and pivoted in April; the left canine was pivoted some years ago. The left first molar, the second bicuspid, and third molar are out; the second molar and second bicuspid are crowned.

The lower denture is about in the same condition as the upper. From the canine on the right to the first bicuspid on the left the

natural teeth are in place, several of them having been filled. The second bicuspid is off near to the gum; the first molar is out; the second molar and the third molar are capped. On the right side the first bicuspid, the first and second molars are out; a bridge is on the third molar and the root of the second bicuspid.

Finally, as conclusion I present model No. 3 with perfect regularity, except the lower right canine slightly overlapping the upper right canine. Some, but not many, of the teeth have been filled. This is a sister to model No. 4, as I have already mentioned, and I extracted her permanent first molars when she was ten years of age. She is now twenty-two, and has splendid teeth, and will have during life. I have left the irregularity of this case until I was perfectly satisfied as to the result time would give us in improving the general condition.

After twelve years' experience and careful watching, I have concluded to extract the permanent first molars between the ages of nine and ten or ten and eleven, and it will improve the general condition of the teeth from twenty-five to fifty per cent. in eight out of ten cases. I make this my rule and guide: If teeth are at all crowded or jaws small, I extract; if teeth are poorly assimilated, I extract.

Thanking you for your attention, I invite criticism and suggestions,—for that is our aim, to give and to receive, in this liberal and fast-advancing profession. Dr. Osler said some time ago that our profession had been almost perfected in the last twenty-five years.

Please allow me to amend my paper and to say that extraction of the permanent first molars not only corrects and facilitates the correcting of irregularities, but improves the entire dentition as to preservation and use.

Dr. Roach's models of the cases referred to in the paper were examined with much interest by those present.

Discussion.

Dr. C. C. HARRIS, Baltimore, was in favor of extracting the first molars when they were defective, but thought it a mistake to extract them too early. The continued presence of these teeth is necessary for a full development of the jaw, and if they are extracted there will be a contracted condition of the upper face which will destroy that symmetry upon which its beauty depends; and not only will the beauty of the face be lost, but when these teeth are extracted before the eruption of the second molars the mouth will not open so freely, and all the teeth will be liable to suffer with pyorrhea alveolaris. The two points gained by the retention of these teeth in place until the second molars are erupted are elongation of the bite and symmetrical facial expression.

Dr. H. B. NOBLE thought it very inadvisable to advocate to the younger members of the profession the extraction of these teeth. Taking up model No. 1 exhibited by Dr. Roach, he said he would like to see that young man. He asked Dr. Roach if the third molars in this case were fully developed, good teeth. If they are, the mouth will be too full, because of the moving forward of the

back teeth. The first molars if left in position would have preserved the regularity of the arch, and they should not have been extracted.

Dr. ROACH said that in this case there was no facial expression which indicated the loss of these teeth, and in consequence of their extraction the young man will have good teeth through life. He asked if this is not better than if the first molars had been retained and the whole set had been subject to decay and loss on account of their retention.

Dr. NOBLE said that the first molars are the best and strongest teeth in the mouth. Nature puts them in their place to do the work of masticating the food while the permanent teeth are coming in. They also serve a very important place in maintaining the other teeth in position, and they cannot be removed without injury to the whole arch.

Dr. W. A. MILLS said that the terms "sixth-year" and "twelfth-year" molars should not be used for these teeth; the proper designation is first and second molars. In reference to the extraction of the first molar, he was decidedly against it generally. In not less than ninety-eight per cent. it is better to retain it. If these teeth are sacrificed, irregularity will result in a majority of cases, with malocclusion and faulty mastication through life. In many cases the third molar is imperfectly developed. Frequently it does not appear at all, and if in such a case the first molars have been sacrificed the condition of the mouth will be deplorable. Instead of sacrificing them indiscriminately, as is sometimes urged, he has found it good practice to preserve the roots of these teeth as long as possible, even though the crowns are all decayed away.

Dr. W. A. MONTELL, Baltimore, had been looking at model No. 2, and he declared that with the teeth occluding as they did in that model, no manner of food would have the chance of being properly masticated. The teeth are tilted forward, occlusion is totally destroyed, and mastication absolutely impossible. The first molar is the bulwark of the arch, and if it be taken away the shape and usefulness of the true arch will be destroyed. Sometimes it is necessary to extract one of these teeth, and in such case the others must be extracted also to preserve the symmetry of the face; but, if at all possible, it would be better to save all, and we cannot do our duty unless we do save them in every possible case.

Dr. A. W. SWEENEY, Washington, said the title of the paper is "Irregularities Benefited by the Extraction of the Sixth-Year Molars." The paper itself and the discussion have covered a little wider ground. In the treatment of irregularities it becomes necessary sometimes to extract some tooth. For instance, Dr. M. C. Smith showed us a model last night where there were several supernumerary teeth. In such a case no doubt some must be extracted, but it is questionable whether in any other case extraction was ever justified. In the practice of those generally received as authorities the rule is never to sacrifice any tooth that can be saved; if a tooth is extracted, it must only be as a last resource. He was not sure that all would agree with him about the origin of the human

species, but, whether we speak of an all-wise Creator or simply of nature, we may rest assured that there was no mistake made in the creation of these dental organs. It is just as surely the plan of wisdom to have thirty-two teeth in the mouth as to have four fingers on each hand. You can get along with thirty-one teeth or with three fingers, but you would not as a matter of choice.

Now, extraction has been recommended to cure irregularities and prevent caries, and if a tooth must be extracted for either purpose, it remains to be decided which tooth had best be sacrificed. Dr. T. B. Welch, in the *Items of Interest*, a few years ago said, "The gentleman may select the first molar if he thinks proper, but to resort to such an expedient will be likely to be productive of more experience than satisfaction," and I think he struck the nail on the head neatly. In former times the extraction of these teeth seemed necessary and advisable, but with the advanced knowledge of this day, and with the appliances at hand for treating diseases and irregularities of the teeth, it ought not be necessary even to discuss it, but every now and then it pops up. Only a few years ago an illustrated article by a distinguished dentist over the water went the rounds of the journals advocating the extraction of these teeth for the purpose of lessening the attacks of caries. Some say that by the removal of these teeth you obviate crowding; but do not the teeth need to be crowded together,—not irregularly, but in close contact? If not, why do we take so much trouble to knuckle our fillings? The teeth are like a line of soldiers,—so long as they stand shoulder to shoulder the line is intact, but when gaps in the line are made the formation is broken and the individuals are soon scattered. He doubted whether at any convention models of mouths had ever been shown from which the first molars had been extracted thirty years previous. He had a patient some time ago whose first molars had been extracted in her childhood, and though the teeth did not decay, they did, one after the other, fall out. Sometimes it is necessary to extract one or more teeth for the correction of irregularities, and in some cases it may possibly be advisable to extract the first molars, but it would be very rarely, if ever. We should look not at what the result would be in two years or five years, but in twenty, thirty, or fifty years.

Dr. WMS. DONNALLY, Washington, said Dr. Roach had had the courage to present a good paper on a subject that has been before the profession a good many years. It is necessary in many cases for the dentist to make a choice between two evils, and sometimes it will be found necessary to extract the first molars, especially in the lower jaw, and later in the upper jaw. Some one spoke of the plan of our Maker in the arrangement of the teeth, and of the teeth as perfect organs, but we know that at this day the teeth, and especially the teeth of our patients, are not perfect organs. In many cases the hygiene of the mouth has been neglected, and in others there is a crowded condition, the arch not being large enough to contain all the teeth. In such a case it may be necessary to extract.

Dr. M. F. FINDLAY, Washington, asked Dr. Roach if he had said

that because of the extraction of the first molars the third molars would be increased one-third in size.

Dr. ROACH said these teeth would be larger because they would have more room.

Dr. C. J. GRIEVES, Baltimore, quoted from Angle's "Malocclusion of the Teeth" to show that the author's experience forbade the extraction of first molars.

Dr. M. C. SMITH, Lynn, Mass., thought, first, that the time which Dr. Roach advocated for extraction was wrong, and, secondly, the reason that he gave for extraction was not allowable. In his practice, when a new patient comes in a model of the mouth is made, and these models are studied before the patient returns for the next sitting. Early extraction of the first molars will shorten the face. Does the patient laugh on one side? The extraction of a molar may remedy this. Say we have finally concluded to take out the molars; then we have a consultation before the first one is extracted. Some of the worst results ever seen have been from the extraction of the first molars, and some of the best results. If the face is one-sided, this may be corrected by taking out the first molar. If the pulp of a first molar dies, is it advisable to save the tooth for a permanent tooth? On the other hand, is it advisable to remove four well-developed first molars to make room for the other permanent teeth?

Dr. ROACH was obliged to the members for the criticism they had made of his paper. He knew that he was almost alone in the views which he had expressed. He always takes impressions of his cases and studies them in the same manner and for the same purpose that Dr. Smith does, and, of course, does not always extract. We must see whether there is room for the third molars, and we do look forward for twenty and for forty years and feel the responsibility of what we are doing. He maintained that in nine cases out of ten, where the extraction is done after due consideration and for reasons well understood, the operation is clearly advisable and beneficial.

(To be continued.)

FIFTH DISTRICT DENTAL SOCIETY OF THE STATE OF NEW YORK.

(Continued from page 809.)

SECOND DAY—*Morning Session* (continued).

Dr. I. C. CURTIS, Fulton, N. Y., read the following paper:

SOME PHASES OF PROSTHETIC DENTISTRY.

There is a growing tendency upon the part of the better class of dentists to disparage mechanical dentistry, and to look down upon the one who devotes a part of his time to it. It is not an uncommon thing to hear dentists say, "I never extract a tooth or make a plate; in fact, have not done any mechanical work for years." To such men my remarks will probably not be of interest. I would, however, say to them that if the same grade of talent were to be applied to prosthetic that is to-day given to operative dentistry there would

not be so many glaring exhibitions of artificial dentures. Then, too, there is another side to the question. You of mature years, and whose hair is sprinkled with gray, must confess that you have patients of whose organs of mastication you have had the care for years, and after carrying them through the various stages of fillings and crowning and bridging, disease or age at length forces you to say, "There is nothing left but to resort to an artificial denture." I ask you, Is it fair to your patient, after he has been faithful to you through all these years, to at last turn him off like some animal that has outgrown its years of usefulness and oblige him to accept of the services of some one whom you have looked upon as your inferior in the profession? It is your privilege to decline to increase your *clientèle*, but it is your duty to continue to furnish the same skill in producing artificial substitutes to take the place of the organs of mastication your patients have lost through your inability to save.

That too many artificial teeth are worn no one will dispute, but that many must be worn is just as true. The selecting for size, shape, color, bite, and arrangement must be governed by age and temperament, as well as nationality; and each case must be a study of itself, and I would lay emphasis on the word "study." Josh Billings once said, "Everybody thinks he knows how to run an hotel, and that accounts for the number of poor ones." Perhaps that may apply to making an artificial set of teeth. There are some things that are prerequisite to make a success, three of which are a perfect impression, cast, and bite. In many people the roof of the mouth is so sensitive to the touch that nausea is sure to occur in taking an impression. In such cases paint over the posterior arch with a ten per cent. solution of cocain, and, after waiting two or three minutes, you will be surprised at the result. For taking an impression, I use nothing but plaster, for the reason that it will not bend; and if it breaks the pieces can be readily replaced and fastened with hot wax. In taking an impression, first see that the tray is of suitable size, and do not fill it nearly full of plaster, but place it around the rim and front half of the middle part. Take your spatula and spread a quantity over the roof of the mouth, working it to place with the finger, and the same amount placed on the outside of each maxillary tuberosity; then if the tray is carried to place the plaster will not be forced on the soft palate. In case that such should occur, a quick stroke of the finger will remove it and bring it out of the mouth. Press the lips and cheeks to force the plaster into contact on the outside of the ridge, and you have eliminated some of the chances of an imperfect impression.

Having obtained a satisfactory impression, the next step is to obtain a smooth and perfect cast. A solution of anilin in alcohol is painted on the impression; when dry, paint over with liquid silix two parts and water one part. This will give a smooth, glassy surface, to which the plaster will not adhere. Use no oil or anything else after the silix is painted on.

In separating the cast from the impression, the anilin will give you a line to work to. After the cast is separated a line is made with a pencil to mark the surface you wish to cover with your plate;

and here let me add that I have the best results where I make the line as deep as the thickness of a common pin, and deeper at the posterior part on each side of the median line, to make the plate imbed itself in the soft palate, but not in the median line, for at that place the two halves of the palate process unite and form a ridge not so deeply covered with flesh. Coat the cast with silex and water, and when dry you are ready for the bite.

There is probably no part of the operation that has more uncertainty connected with it than the simple act of what is termed "taking the bite," and I doubt there being one here (provided he does mechanical dentistry) but that has often found the patient did not close the jaws together properly and the bite was imperfect. Various plans have been advocated, and all have their good points, but the fact that we continue to see imperfect occlusion in artificial dentures forces us to think that others fail as well as ourselves. In taking the bite, chill the wax on the rim and try in the mouth, cutting the wax down until the antagonizing teeth all touch and the mouth, when the lips are closed, assumes a natural appearance. Remove and place a layer of softened wax on the hard rim, and when the teeth are closed upon it they cannot penetrate into the hard part, and you have maintained the desired distance apart.

The plan I have found most satisfactory is based on the principle that the jaw cannot be carried too far back, save in very rare cases. Such exceptions occur in very old and very much relaxed ligaments. To force the jaw back as far as possible, place the bite in the mouth, the head being firmly placed in the head-rest, and ask the patient to open the mouth to the extreme limit, which will bring the condyles to the extreme edge of the glenoid fossa. Grasping the chin firmly with the hand to prevent the closing of the mouth, ask the patient at the same time to close the mouth, and, after two or three efforts have been made by the patient, finally allow it to close, which it will do with a snap, and the condyles will have taken the position which nature assumes when the teeth are in a normal position.

With a perfect impression, cast, and bite, and an ideal gained from studying the particular case, there can be no excuse for the malfitting, maloccluding caricatures justly termed *false teeth*. I have for inspection an impression and a cast, which I will pass around. Every one thinks he knows how to take an impression, and perhaps he does, but a good one may be ruined by its after-treatment. If you use varnish, then the oil you use to prevent sticking produces a condition of affairs on the cast called flouring, and the less you have of that the better.

In the specimens I show you the impression is first colored by coating it with a solution of anilin in alcohol, and when dry adding a coat of dilute silex, water one-third, liquid silex two-thirds; when this is dry pour the plaster on the silexed impression, and you are pouring it on a surface almost as smooth as glass and that has no substance that will act in any manner upon the plaster. The anilin will give you a line to cut to in the separation, and the coat of silex on the cast will give you a surface that the rubber will not adhere to in vulcanizing; it also gives a good, hard surface to the cast

while working with it. A foot bicycle pump will facilitate matters very much in the drying of the anilin and silex coats.

In the foregoing remarks, please do not think that the school-master is abroad, but rather that the saying that the sum-total of all learning is made up of "littles" is true; and if I have added one little I am content.

Discussion.

Dr. A. R. COOKE, Syracuse, asked Dr. Curtis if he used anything on the casts over the silex.

Dr. CURTIS said there is no need to use anything besides the silex. It took the place of the tin foil that we formerly used to make a smooth, hard surface.

Dr. S. B. PALMER said the paper just read contained more valuable points than any paper of its length that he ever heard. He does little mechanical work himself, but when he does make a case he is able now, on account of the progress in knowledge on the prosthetic side of dentistry within the past few years, to do better work than he did years ago. This paper brings up just those points which will enable us to improve.

Dr. CURTIS, by request, demonstrated his method of getting a correct bite, showing very plainly the snap that occurs when the jaw is closed against the opposition of the dentist's hands.

Dr. G. H. HARDISTY, Syracuse, thought that Dr. Curtis was rather too sweeping in finding fault with those who sent their patients to others who would do better mechanical work than themselves when they were in need of artificial teeth. He had done this for years, not because he had any disrespect for those who did the work, but because he felt that those who were constantly engaged in mechanical dentistry, and who were otherwise trustworthy dentists, would naturally do better with it than could any dentist whose time was fully occupied with operative dentistry. Dr. Curtis's way of taking the bite was, in his opinion, very practical.

Dr. CURTIS, in closing the discussion, said that no man had a perfect method, but each had some points in which he excelled, while another excelled in some others. When we get together and learn from each other these little excellences, we have each the opportunity of adopting a method made up of all these good points. He had had no intention of blaming dentists who sent their patients to those who were superior mechanics when mechanical work was needed, but his contention was that the dentist owed it to his patient to refer him to some one who would do worthy work, and to see that the work when done was correct.

On motion, the subject was passed, and the following paper was read by Dr. F. R. ADAMS, Vernon, N. Y.:

DENTAL ETHICS.

Ethics is a hard word to define in a few words, because the distinction between ethics and morality or politics is so subtle as to be hardly distinguishable. Webster defines ethics as "the science of man's duty," and the Century as "the doctrine of man's duty in respect to himself and the rights of others." Some authorities make ethics synonymous with morality.

Ordinarily, ethical teaching is more or less superficial, inasmuch as it teaches us to be honest, not for the sake of honesty itself, but because it is better for us to be honest than it would be if we were dishonest. To quote from the Britannica, "The good which ethics investigates is 'good for man' to distinguish it from universal or absolute good." The subject of my paper should have been "Ethics as Applied to Dentistry," rather than "Dental Ethics." Certainly, the subject of general ethics covers dental ethics; the duty of man includes the duty of dentists. The Century definition puts man's duty to himself first, and his duty in regard to the rights of others second. The professional man's first duty is not to himself. The first duty of a minister is to his parishioners; of a lawyer to his client, and of a physician or dentist to his patient. The ethical principle is included in the moral law. The teachings of moral law are obeyed, not because of the teachings, but because of the conscientiousness of the man. The man's own conscience must be his accuser; each man must be his own judge of what is right or of what is wrong. Some men believe it wrong to play cards, attend dancing parties, or read novels, but it does not follow that all mankind must abstain from these amusements because some few men think them wrong. There is no question as to the justice of the Ten Commandments, yet their teachings are as old as creation. God punished Cain for murder twenty-four hundred years before the birth of Moses. What man is there among us who abstains from stealing, killing, or bearing false witness against his neighbor simply because the Ten Commandments forbid these crimes? Which one of us ever thinks of the Ten Commandments as a rule and guide for our practice? A man's own conscience would tell him that the various acts forbidden by the commandments were crimes if Moses had never been born. As a man's own conscience must be his guide in the performance of his moral obligations, so must a man's own sense of honor be his ethical guide. You would have little respect for a man who refrained from stealing simply because there is a law against it, and because he would make himself liable to punishment if he violated that law. He would steal if he thought he would not be caught. Neither would I have any respect for a dentist who conducted his practice in an ethical manner simply because the code forbids unethical conduct. You may be sure that the man who needs the code to keep him ethical has violated nearly every principle of ethics when he thought he would not be caught. The dental code of ethics is unnecessary. A gentleman will be ethical without a code, and you cannot legislate cadts into gentlemen by any process. An honorable man will be honest without a code, and the dishonorable man dishonest in spite of a code. A man in any walk of life must behave as a gentleman if he wishes to associate with gentlemen. Still, your clubs do not have rules adopted defining gentlemanly conduct. It cannot be defined.

No more can a set of rules be devised which, if obeyed, will make a man ethical. Each day brings up new ethical problems, which you must decide for yourself. I presume that you are familiar

with the code of ethics adopted by the Fifth District Society. The first article refers to the duty of the profession to their patients, and simply requires that a man be honest with them and use tact in their management. This is indeed quite important, and it would be well to add a section forbidding a dentist from filching any of their jewelry while in the operating chair, as this would constitute highly unprofessional conduct.

The second article refers to the maintenance of professional character. The first section refers to the duty of the dentist to the profession. It simply requires him to be a gentleman. Can a set of rules create gentlemen? The second section provides that the dress and office arrangements of a dentist should indicate that he is a gentleman. They will if he is a gentleman. Would it not be wise under this section to adopt a rule forbidding the dentist to wear dirty linen or rubber boots or pajamas while in the office? The third section refers to advertising and quackery, and I will quote it: "It is unprofessional to resort to public advertisements, cards, handbills, posters, or signs calling attention to peculiar styles of work, lowness of prices, special modes of operating, or to claim superiority over neighboring practitioners; to publish reports of cases or certificates in the public prints; to go from house to house to solicit or perform operations; to circulate or recommend nostrums, or to perform any other similar acts."

I cannot see where or how this section prevents advertising. It simply limits a man to advertising in good taste. A man can advertise in a most effective manner without "calling attention to peculiar styles of work, lowness of prices, special modes of operating, or claiming superiority over neighboring practitioners." I believe that if a man wants to advertise, let him. If he hasn't judgment or tact enough to advertise in good taste, so much the worse for him. The advertising is done now mostly by the quack, and the people suffer accordingly. The laymen of a certain class are attracted by self-praise, hence the quack gets patients. It is not advertising that has done harm, but the advertising of incompetent dentists. A man catering to the best class of patients would be foolish to advertise as does the quack, because the best class of people would not be influenced by such an advertisement. There could be volumes written on this section. Every dentist has an opinion different from his brother dentist, and they will never agree. The thing most necessary to stop quackery is education of the public. I say education of the public because we cannot educate the quacks. Quacks are stubborn things, and deliberately swindle the public, not caring as to the dishonesty of the procedure. The dental profession is sitting back doing nothing, and watching the people getting buncoed. Get together and do something! It is said that "time righteth all things," and possibly this will be worked out in time. "It is unprofessional to circulate or recommend nostrums." What is a nostrum? Some time ago the New Jersey Dental Society appointed a committee to investigate the different dentifrices upon the market and report upon them. They accordingly reported. The firm whose dentifrice was reported as being

the best got hold of the report and used it for advertising purposes. The society served an injunction upon the firm, forbidding them to use the report. I should have thought that if this particular dentifrice was the best one on the market, that the members of the society would have wanted it used as extensively as possible, and surely the best way to get it before the public was by the method adopted by the firm.

Section 4 refers to professional intercourse. It is always violated by the quack, and often by members of the profession who are not classed as quacks. "When consulted by the patient of another practitioner, the dentist should guard against inquiries or hints disparaging to the family dentist, or calculated to weaken the patient's confidence in him." This section is violated by men who would hold up their hands in holy horror at the thought of an advertisement. An honest man would not violate the principle of this section anyway; a dishonest one will. As the code cannot make or unmake character, of what use is it?

Section 5 refers to the deviation from general rules which have been adopted by the members of the profession in a certain locality in relation to fees. I cannot understand by what right the members adopt rules in regard to fees. Every dentist is the best judge of the value of his services, and should have the privilege of charging as much more or as much less than his neighbor as he chooses. This section also refers to the unprofessionalism of warranting work. If a dentist can make his patients understand that he is honest, and that he means to do what is right by them, I do not think they will ask him to warrant his work. But if I were satisfied that a tooth was in good condition to fill and knew that I could fill it in a thorough manner, and the patient insisted that I warrant the work, I think that, rather than see that patient go away with his pocket-book, I should warrant that work.

Article III refers to the relative duties of dentists and physicians, and is of more importance to the physician than to the dentist. It amounts to nothing anyway, and makes the remarkable statement that the physician is superior to the dentist in regard to diseases of the general system, and that the dentist should be more familiar with the diseases of the dental organs and mouth than the general practitioner. The statement ought also to have been made that a blacksmith is expected to be more familiar with shoeing horses than is the dentist; also that dentists are not expected to take charge of cases of childbirth.

Article IV refers to the duty of the profession and the public, and teaches that a dentist should endeavor to educate the public in regard to the imposition of the quacks. This matter has been gone over before.

Thus endeth the code of ethics. Now, what does it all amount to? The greatest ethical law ever written, the one which includes all the teachings of the code, and, in fact, of all ethical law, is, "Do ye unto others as ye would that others should do unto you." If we will only keep this maxim before us and try to live up to the best that is in us, we will not need any code of ethics. "Honesty is

the best policy." And while the dishonest man may seem to flourish to-day, yet at last the man who conducts his practice in a straightforward, honest manner will prosper, and he will have, besides, that greatest of all blessings,—a clear conscience.

"This above all: To thine own self be true, and it must follow, as the night the day, thou canst not then be false to any man."

There was no discussion of this paper, and Dr. GEO. H. HARDISTY read the following paper:

ORAL HYGIENE IN OUR PUBLIC SCHOOLS.

Our children, their health and happiness, should be an interesting subject for a sincere man's most earnest thought. If individually one fails to realize this as a truth, it is because you have not had the pleasure of looking into the happy eyes of a child of your own in health or experiencing the anxious concern that weighs upon the heart when those bright eyes grow dull, the rosy cheek pales, and activity ceases, and the apple of your eye lies feverish and emaciated upon a bed of pain night unto death; or possibly shall pass through the valley of the shadow into that place of eternal peace, to ever behold the face of their Father which is in heaven. These and similar experiences make us thoughtful and concerned in those things which in any way may become a factor in lessening the dangers to which the child may be exposed.

We have all been surprised at what we deem gross ignorance of dental prophylaxis revealed in those otherwise so highly informed and cultured, but have overlooked the fact that a perfectly normal and healthy mouth naturally requires no more attention or care than any of the rest of the mucous-membrane-covered organs. Another fact, however, is that a perfectly normal healthy mouth is one of the most rare of all beauties we behold, but, on the contrary, the mouth is usually the hotbed of bacterial pollution.

Parental ignorance as to so simple a need as that of oral cleanliness is one of the startling things the dentist has to contend with. See the children that are reared to-day; notice the condition of their teeth and the wrecks of humanity they are, while the parents are oblivious of the consequence of their neglect, paying too little heed to the physical welfare of their own offspring, conditioned largely by the septic character of the bacterial growths, their ferments and toxins that infest the mouth and find their way into the system.

Medical and scientific authorities recognize that most of our diseases, aches, and pains are the result of bacteria that have gained entrance to the human system through this channel, and that the germs of our most dreaded diseases are generally discovered first in the mouth, as instanced by Williams, Galippe, Miller, and others.

Bacteria, however, remain inert in the mouth so long as a state of asepsis is maintained, but when through simple neglect it becomes favorable to the propagation of germs, they multiply with fearful rapidity; the tongue and tonsils become coated with foul bacterial growth; the breath becomes disgusting, and tonsillitis, indigestion, neuralgias, possibly diphtheria or other contagious dis-

eases and serious systemic disturbance, follow as the system becomes unable to throw off the toxins excreted. Thus disease and death are frequently the result of a degenerative process begun in the mouth. Now, with the condition of general ignorance existing, shall we continue to sit in judgment upon the unenlightened?

The special field of our study and labor bring us into important counsel every day concerning oral hygienics. But the sphere of usefulness is limited indeed, if you narrow yourself down to professional advice and instruction that shall be given only to the limited number coming into your office for consultation with you or the expression in favor of care of the mouth you may impress upon your own household.

As we cannot reach the home circles effectively through contact with our allotted *clientèle* for proper education in this direction, and cannot educate the parent to educate the child, why not properly instruct the child in the schools?

With the widening sphere of the dentist's usefulness, the demand for his knowledge of how to prevent certain difficulties and lessen possible recurrences of oral imperfections, etc., has become the order of things. Right here is where the dentist should grow and become liberal in the generous giving from his acquired store of useful information.

Have you not noticed the general tendency to a prevalence of throat and nose difficulties or an aggravation of mucous disease in children, marked most frequently at the opening of each school term? Have you ever frequented the schoolroom and not had your olfactories set your thought factory in motion as to the origin of the peculiar aroma in the atmosphere? That aroma is largely caused by the exhalation of air through the oral and nasal cavities and over their foul surfaces; it is freighted with the very poison that, when it finds lodgment in fertile soil, precipitates the occasional epidemics of children's diseases.

How effectually would a thoroughly aseptic condition of the mouth aid in guarding our children! And what is our duty when we know that bacteria remain inert under these conditions? Reach the child in the years when the knowledge you impart shall become a part of his or her applied wisdom through future years.

You say the school curriculum is already overfull; the teachers' time is now so overcrowded that they cannot begin to give even the theory of the studies they are expected to teach, and there is no time or place for the introduction of this kind of reform in the educational methods. There is where I disagree with you. The schools are open, and school board and teachers and the organized mothers' clubs and the children are approachable and anxious to gain just such practical information and put it into effect; but you must do the work of educating. How? By occasional practical talks or lectures before the scholars and the organized mothers' clubs, now so generally having their meetings and their interests in schools attended by their offspring. There are enough *dentists* in any community who are qualified to lecture and write interestingly and instructively upon oral hygienics, and so thoroughly to educate

the coming generation that neglect of proper care and precaution of the mouth such as would be beneficial to health and a safeguard to others would be the exception, not the common order of things.

I believe the members of the recognized dental organizations of the state should be the men to meet this particular need of the hour, and that the more general the participation in the effort the more practical and complete will be the character of the knowledge thereby imparted, and I would suggest that you gentlemen, in the name of humanity and for the honor of the profession, use your influence to help educate the masses in this science of which they are so ignorant. Let your voice and pen convey your thoughts from the platform and through literature, so that the world shall have become the better for your having been in it.

You may think this has no other side than that of the fascination of talking to and entertaining an audience, but it is, by far, farther reaching:

It tends to purify the very atmosphere that is laden with toxic odor.

It teaches the growing mind that ounce of prevention that is worth a ton of cure.

It paves the future with promise for the young man just entering the arena with professional hopes and ambition. It prepares the way to an increasing practice for every practitioner, with its financial gain (and that interests you all), and it will tend to elevate the professional status in any community.

(To be continued.)

TEXAS STATE DENTAL ASSOCIATION.

THE annual meeting of the Texas State Dental Association was held at Sherman, Texas, May 14, 15, and 16, 1901. There was a good attendance, and the meeting was in every way a success.

The following officers were elected for the ensuing year: H. L. Pearson, McKinney, president; J. G. Fife, Dallas, first vice-president; Thos. P. Williams, Houston, second vice-president; Bush Jones, Dallas, secretary and treasurer; A. P. Sontag, curator of museum. Executive Committee—Samuel G. Duff, chairman, Greenville; E. F. Comegys, Gainesville; W. R. Rathbone, Cuero.

Waco was selected for the place of the next meeting.

BUSH JONES, *Sec'y.*

AMERICAN SOCIETY OF ORTHODONTISTS.

At the first annual meeting of the American Society of Orthodontists, held in St. Louis, Mo., the following officers were elected: Edward H. Angle, St. Louis, president; William J. Brady, Iowa City, vice-president; Milton T. Watson, Detroit, secretary-treasurer. Board of Censors—Richard Summa, St. Louis; Henry E. Lindas, Great Bend, Kan.; Wm. Ernest Walker, New Orleans.

MILTON T. WATSON, *Sec'y.*

WASHINGTON STATE DENTAL SOCIETY.

THE fourteenth annual meeting of this society was held at Collins Hall, Seattle, Wash., May 23, 24, and 25, 1901. Papers were read as follows: "Cocain: the Danger Following its Use in Dentistry," by W. A. Wright, Spokane; "Dental Ethics," by M. G. Covey, Seattle; "Immediate Root-filling," by A. J. Garesche, Victoria, B. C. Papers were also read by A. B. Bailey, Spokane; Wm. Dorfner, Seattle, and H. K. Parr, Spokane. Dr. G. V. Black, of Chicago, Ill., was present and on the evening of the closing session gave a lecture illustrated by the stereopticon. Clinics were given by Dr. G. V. Black, E. Otis Whitney, B. F. Eshelman, P. H. O'Connor, E. B. Edgers, Wm. E. Burkhart, and J. M. Meyer. The social features of the gathering were highly enjoyable, including an excursion by the members on Puget Sound. The meeting was one of the most successful in the history of the Association.

The officers for the ensuing year are: Dr. B. F. Eshelman, of Tacoma, president; W. A. Fishburn, Ellensburg, first vice-president; F. W. Rees, Walla Walla, second vice-president; F. I. Shaw, Seattle, corresponding secretary; F. R. Fisk, Spokane, treasurer.

DENTAL COLLEGE COMMENCEMENTS.

PITTSBURG DENTAL COLLEGE.

THE fifth annual commencement exercises of the Pittsburg Dental College (department of the Western University of Pennsylvania) were held in Carnegie Music Hall, Pittsburg, Pa., April 30, 1901.

The number of matriculates for the session was one hundred and eighty.

The degree of D.D.S. was conferred, by J. Crocker White, L.D., president of the university, upon the following graduates:

Chas. H. Alter.....	Pennsylvania.	M. P. Johnson.....	Pennsylvania.
F. F. Arthurs.....	Pennsylvania.	J. E. Kerr.....	Pennsylvania.
F. F. Brown.....	Pennsylvania.	Robert Kerr.....	Ontario, Can.
C. E. Carroll.....	Pennsylvania.	G. C. Lake.....	Pennsylvania.
J. H. Chessrown.....	Pennsylvania.	Mrs. L. W. Laufman..	Pennsylvania.
R. R. Christy.....	Pennsylvania.	D. S. Leet.....	Pennsylvania.
Ira L. Cochran.....	Pennsylvania.	L. G. Leffingwell.....	Pennsylvania.
P. C. Conwell.....	Pennsylvania.	C. N. Mertz.....	Ohio.
B. H. Dreutlein.....	Pennsylvania.	E. W. Mertz.....	Ohio.
T. F. Farrell.....	Pennsylvania.	W. M. Miller.....	West Virginia.
H. E. Finney.....	Pennsylvania.	N. P. Myers.....	Pennsylvania.
Emil Freyer.....	Pennsylvania.	J. W. McConnell.....	Pennsylvania.
J. F. Gatts.....	Pennsylvania.	C. L. McGovern.....	Pennsylvania.
F. L. Gould.....	Pennsylvania.	B. Nathaniel.....	Pennsylvania.
H. M. Griffiths.....	Pennsylvania.	T. F. Potter.....	Pennsylvania.
J. H. Held.....	Pennsylvania.	John W. Rodenbaugh..	Pennsylvania.
J. E. Hitchins.....	Pennsylvania.	A. M. Stille.....	Pennsylvania.
R. F. Horner.....	Pennsylvania.	E. B. Swartz.....	Pennsylvania.
G. W. Horrocks.....	Pennsylvania.	W. S. Weddell.....	Pennsylvania.
Pauline Horvitz.....	Pennsylvania.	J. O. Wells, Jr.....	Pennsylvania.
A. C. Howard.....	Pennsylvania.	Harry White.....	Pennsylvania.
H. D. Howard.....	Pennsylvania.	F. B. Wilson.....	Pennsylvania.
H. D. Imbrie.....	Pennsylvania.	W. C. Wolford.....	Pennsylvania.
R. B. Jameson.....	Pennsylvania.	J. Y. Woods.....	Pennsylvania.

TUFTS COLLEGE DENTAL SCHOOL.

THE annual commencement exercises of Tufts College Dental School were held in the college building, Boston, Mass., June 19, 1901.

The number of matriculates for the session was one hundred and seventy-six.

The degree of D.D.S. was conferred, by President E. H. Capen, of the college, upon the following graduates:

Thos. Aery, Jr.	Massachusetts.	Blanche M. Kenney.	Rhode Island.
Leonard M. Bradlee. .	Massachusetts.	Jean E. Kenswil. . .	South America.
Walter G. Bridge.	Vermont.	Alfred E. Knight. . .	Massachusetts.
Alfred H. Brown.	Massachusetts.	Geo. W. Leith.	Massachusetts.
Louis N. Chapman. . . .	Massachusetts.	Henry Leland.	Massachusetts.
Howard W. Church. . .	Rhode Island.	Murray T. Luce.	Massachusetts.
F. Corbett, A.M.D. . .	Rhode Island.	G. M. McElhinney. .	Canada.
William S. Coy.	Rhode Island.	Edw. T. McGourty. .	Massachusetts.
John W. Coyne.	Massachusetts.	Fred. J. McTeer.	Maine.
Thos. A. Crawford, Jr.	Massachusetts.	Wm. L. Merrill.	Maine.
Chas. A. Cronan.	Massachusetts.	Wm. A. Neals.	New Hampshire.
John M. Curley.	Massachusetts.	W. F. Nichols.	Maine.
Wendell F. Davis.	Massachusetts.	Arthur P. Nute.	Massachusetts.
Waldo F. Dean.	Massachusetts.	J. E. C. O'Donnell. .	Massachusetts.
L. B. De La Bruere. . .	Canada.	Lester Parker.	Massachusetts.
Jos. F. Delahanty. . . .	Massachusetts.	Claude M. Proctor. .	Massachusetts.
E. A. De Wager.	Massachusetts.	Clarence A. Race. . .	Maine.
Corinne E. Duncan. . .	England.	C. M. Richmond. . .	Vermont.
Thomas A. Ford.	Massachusetts.	Walter N. Roberts. .	Connecticut.
Julius C. Gallup, Jr. . .	Rhode Island.	Fred. T. Sherry. . . .	New Hampshire.
Wm. H. J. Gorman. . .	Massachusetts.	Geo. A. Smith.	Massachusetts.
Robt. F. Hayden.	Massachusetts.	James F. Smith.	Massachusetts.
Jeppe C. Jepson.	Massachusetts.	Hugo S. Thomson. . .	Connecticut.

HARVARD DENTAL SCHOOL.

THE annual commencement exercises of the Harvard Dental School were held in Sanders Theater, Cambridge, Mass., June 27, 1901.

The number of matriculates for the session was one hundred and twenty-six.

The degree of D.M.D. was conferred on the following graduates by Chas. Wm. Elliott, LL.D., president of the university:

Fenimore S. Andrews.	Massachusetts.	Rufus H. Gould.	Massachusetts.
Roland S. Barney.	Massachusetts.	Hugh K. Hatfield.	Massachusetts.
Leslie B. Boutwell. . . .	Massachusetts.	Chas. L. Joslin.	Massachusetts.
Fred. P. Brown.	Massachusetts.	Henry H. Luther.	Rhode Island.
P. H. Buckley.	Massachusetts.	*Albert L. Midgley. . .	Massachusetts.
Harry H. Cushing. . . .	Massachusetts.	Chas. G. Pike.	Massachusetts.
James W. Cutler.	Rhode Island.	*Norman G. Reoch. . .	Rhode Island.
Walter A. Davis.	Massachusetts.	Arthur V. Rogers.	Maine.
John W. Dickinson. . .	Massachusetts.	*Melville F. Rogers. .	Massachusetts.
John P. Donovan.	Massachusetts.	Paul H. Shinn.	Massachusetts.
Wilson C. Dort.	Rhode Island.	Harry J. Smith.	Washington.
A. C. Edwards, L.D.S.	England.	*C. Tousey, A. B.	Massachusetts.
*Samuel T. Elliott. . .	Massachusetts.	Emery W. White.	Utah.
Ellis V. Fanning.	Massachusetts.	Robert Whitehill.	Massachusetts.
John J. Gallahue.	Massachusetts.		

* D.M.D. *cum laude*.

DES MOINES COLLEGE OF DENTAL SURGERY.

THE annual commencement exercises of the Des Moines College of Dental Surgery (department of Drake University) were held in the University Chapel, Des Moines, Iowa, May 1, 1901.

The annual address to the graduates was delivered by Dr. W. D. Beardshear, president of Ames College.

The degree of D.D.S. was conferred on the following graduates by Chancellor Craig, of Drake University:

J. E. Anderson.....	Iowa.	J. A. Marie.....	Iowa.
A. A. Beck.....	Iowa.	A. M. Maurice.....	Iowa.
A. O. Biers.....	Iowa.	B. L. Miller.....	Iowa.
J. J. Black.....	Iowa.	W. W. Miller.....	Iowa.
L. W. Cochrane.....	Iowa.	M. O'Malley.....	Iowa.
R. S. Cooper.....	Iowa.	F. S. Thornley.....	Iowa.
E. M. Jackson.....	Iowa.	G. C. Wickham.....	Iowa.
A. R. Long.....	Iowa.		

STATE UNIVERSITY OF IOWA, COLLEGE OF DENTISTRY.

THE annual commencement exercises of the College of Dentistry of the State University of Iowa were held in the Opera House, Iowa City, Monday morning, June 3, 1901.

The degree of D.D.S. was conferred, by George D. MacLean, Ph.D., LL.D., president of the university, upon the following graduates:

Graud C. Benson.....	Iowa.	Frank Lang.....	Iowa.
Thos. L. Birchard.....	Iowa.	Luthur T. Lundy.....	Mississippi.
Wm. J. Cameron.....	Iowa.	Cornelius C. Macfadden..	Minnesota.
Willis L. Cannon.....	Iowa.	Lon J. Maxon.....	Iowa.
Lockwood D. Carpenter	Iowa.	Chas. A. Moore.....	Iowa.
Lewis Chamberlin.....	Illinois.	Rolland B. Moore.....	Iowa.
John A. Davis.....	Illinois.	Jefferson C. Morrison...	Iowa.
Jno. D. C. Davis.....	Iowa.	Raymond A. Morton....	Iowa.
James B. Dewey.....	Iowa.	Solomon Moss.....	Iowa.
Arthur J. Faber.....	Minnesota.	Wencil F. Naibert.....	Iowa.
Milford O. Frazer.....	Illinois.	Geo. A. Pringle.....	Wisconsin.
Frank M. Gilbreath....	North Dakota.	George E. Reed.....	Iowa.
Lester L. Godlove.....	Iowa.	Elmer A. Schrader.....	Kansas.
Melvin C. Hamil.....	Iowa.	Charles N. Shane.....	Iowa.
William U. Hammer...	Iowa.	Charles F. Tilton.....	Oregon.
Ralph H. Hecht.....	Iowa.	Louis J. Tourtellot.....	Iowa.
David G. Houser.....	Iowa.	Theo. F. Wait.....	Iowa.
Geo. P. Kier.....	Iowa.	Ella G. Woolverton, M.D.	Iowa.

SAN FRANCISCO COLLEGE OF MEDICINE AND SURGERY, DENTAL DEPARTMENT.

THE second annual session of the Dental Department of the College of Medicine and Surgery of San Francisco terminated May 4, 1901, without formal commencement exercises.

The whole number of matriculates for the session was ninety.

The degree of D.D.S. was conferred upon T. A. Black, B.S.

COLLEGE OF PHYSICIANS AND SURGEONS OF SAN FRANCISCO, DENTAL DEPARTMENT.

THE annual commencement exercises of the Dental Department of the College of Physicians and Surgeons of San Francisco were held Wednesday evening, July 3, 1901, in the Metropolitan Temple, San Francisco, Cal.

The degree of D.D.S. was conferred upon the following graduates by Professor Winslow Anderson, president of the college:

Elmer F. Beach.	Walter Hargrave.	Francis E. Rea.
Willard S. Beach.	G. N. Harris.	Elizabeth E. Richardson.
Chauncey L. Bonstell.	Walter N. Jackson.	Carl W. Schacht.
Robt. H. Burr.	Julius P. Jaegeling.	Chas. F. Schulties.
Rosa M. Close.	Emile B. P. Kemp.	Edgar F. Scott.
Bertram F. Coleman.	Ethelbert W. Leslie.	Geo. F. Shepherd.
Werton J. Congdon.	Robert Y. Leslie.	Charles H. Smith.
Robert B. Criswell.	Samuel T. Luce.	Hal. O. Smith.
Chas. W. Decker.	T. Edw. Moore.	Thos. S. Stealey.
James R. Fowler.	Chas. A. Morris.	Fred. R. Stokes.
Ernest L. Freitas.	Wm. J. Mosher.	Gustav H. Therkof.
Andrew L. Gibson.	Holland M. Nuckolls.	Almer F. Veale, M.D.
Frank R. Gibson.	Victor T. Orella.	Geo. H. Walker.
James F. Gough.	Edmond Pitres.	William A. Whelan.
William Greene.	John J. Quinne.	Paul Wismer.

DENTAL SOCIETY ANNOUNCEMENTS.

NORTHERN IOWA DENTAL SOCIETY.

THE seventh annual meeting of the Northern Iowa Dental Society will be held at Arnold's Park, Lake Okoboji, September 3, 4, and 5, 1901. Hotel rates \$2 a day, and ladies free.

WM. FINN, *Sec'y.*

EDITORIAL.

INTERNATIONAL RELATIONS OF ORGANIZED AMERICAN DENTISTRY.

THE coming annual meeting of the National Association of Dental Faculties, it is presumed, will be called upon to consider not only the domestic features of the educational problem, but to an equal or possibly greater extent the international aspects of the question.

The powers conferred upon the Foreign Relations Committee by the resolution creating that body were, by the wording of the resolution, capable of very broad interpretation, and in view of the efficiency of the committee appointed under the resolution, as well as in view of the practically unexplored field of labor assigned to them, it was perhaps well that in the beginning the committee should be clothed with large discretionary power. The labors of the commit-

tee have undoubtedly been excessive, and they have been compelled many times to act upon cases and to perform other acts without full knowledge of all the circumstances bearing upon the case. That they have done good work is not to be questioned. The experience derived from contact with the educational question in its international bearings, has, however, undoubtedly developed results which the Association as a whole should take into consideration, and by general discussion and free interchange of thought thereon aid the Foreign Relations Committee in perfecting their work and methods by the elimination of whatever features may have been found to be objectionable.

It is clearly evident that the selection of those who make up the *personnel* of foreign advisory boards should be made with the utmost care, and that the duties and the limitation of the powers of foreign representatives should be exactly defined. Much dissatisfaction has already arisen in certain directions by the selection of foreign representatives who in certain instances have not been legally qualified practitioners in the countries in which they are located, and it is clearly evident that harmony of action can never be achieved where such an error in appointment has been made. We take it that the main function of the Foreign Relations Committee is to engender harmony of action upon a basis of equity, and to bring about, as nearly as may be possible, harmony of standards in an international way, as the National Association of Dental Faculties is endeavoring to do in a national way. It should be the object, then, in the appointment of our foreign representatives, to avoid personal differences and antagonisms between these appointees and the profession of the countries which they represent. Personal considerations should have no place in questions of this character, excepting in so far as they may favor diplomatic ends.

Again, numerous instances have arisen in which the appointment as foreign representative has been misused as a means of personal aggrandizement, or offensively used to exalt American dental methods by comparison with the dentistry of other countries. Such results tend to defeat the objects for which the National Association of Dental Faculties is striving and which constitute the motive of its existence.

The offensiveness of the American quack is a difficulty from which we have suffered so much that the complaints against this evil genius by the legitimate practitioners of Europe should receive sympathetic consideration, and a determined effort be made to so protect the American degree that these complaints may have less foundation in future.

The Foreign Relations Committee are to be congratulated upon their efforts to rectify the evils which have grown out of the illegal granting of spurious dental degrees, and it is hoped that not only will the work be carried on until the nefarious traffic is no longer possible, but that a comprehensive manifesto may be issued, setting forth the circumstances surrounding the whole question, and be published broadcast, so that the misunderstanding abroad with respect to the status of the legitimate American dental degree may be corrected and be properly appreciated by the dental profession throughout the world.

SECTION OF ODONTOLOGY CREATED BY THE FRENCH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

We find in *l'Odontologie*, issue of March 15th, announcement of a dental congress to be held at Ajaccio, in the island of Corsica, September 8 to 14, 1901. This event is one of more than ordinary importance, not so much by what may be there accomplished as by what the movement leading to this meeting represents. Following the holding of the Third International Congress in Paris in August last, through the instrumentality of some of the promoters of that Congress, notably Dr. Godon and his colleagues, the Council of the French Association for the Advancement of Science established a section on Odontology, of which the first meeting will be held as stated.

The recognition of the importance of odontology by a scientific association having the status which is universally accorded to the French Association for the Advancement of Science is an event of which the dental profession may well be proud. To draw a parallel which will perhaps be more readily understood in America, the creation of this section is for dentistry in France what the creation of a section on odontology in the American Association for the Advancement of Science would mean to American dentists. It is the official recognition of the importance of odontology as a distinct branch of biology, and having for its field the study and investigation of everything pertaining to teeth, both in man and in the lower orders of organized beings. As we understand it, the newly created section on odontology will not primarily concern itself with the study of odontology from the point of view of the dental practitioner. It is not dentistry as a profession, but dentistry as a science in its broader conception as odontology, which will form the objective basis of study by the section.

Our French *confrères* are to be congratulated upon this official

national recognition of the importance of their field of labor, and those who have successfully brought about the creation of this section on odontology are deserving of the thanks of practitioners throughout the world for conceiving and carrying into successful effect this meritorious project.

DENTISTRY AND THE DEPARTMENT STORE.

THE following editorial statement, which we extract from the *New York Commercial*, issue of June 28, 1901, reports an interesting decision of the New York Court of Appeals which may have the effect of deterring the extension of the plan of attaching to large department stores the dental parlor idea, and tend to keep the practice of dentistry within its legitimate channels.

A few malpractice suits with resultant damages against the proprietors of institutions of this character may bring about a recognition of the fact that dentistry is not a business, but a profession which requires the highest skill and intelligence for its successful practice, and that it cannot be conducted upon the nickel-in-the-slot principle.

LIABILITY FOR "DEPARTMENTS."

It is not impossible that in the expansion of the department store idea the proprietors may be assuming responsibilities and risks that the profits in a special field will not sustain. Recent decisions by the courts have held physicians liable for unskillful or negligent treatment of patients, and now the New York Court of Appeals hands down an opinion holding a corporation liable for unskillful dental work.

This corporation represented that it carried on the practice of dentistry in connection with various other "departments," and it so advertised. A woman customer, or patient, having undergone treatment in the "dental department," brought suit for alleged resultant injury and got a verdict. The defense set up by the corporation was that the dental business was not, in fact, carried on by it, but was owned by the dentist himself.

But the appellate court held that the company, having held itself out as carrying on a dental department and the plaintiff having been ignorant of the fact that the company was not the real owner of the dental department, the corporation was estopped from making such a denial. For, under the circumstances, the court said, "the plaintiff had a right to rely not only on the presumption that the company would employ a skillful dentist as its servant, but also on the fact that if that servant, the dentist, whether skillful or not, was guilty of any malpractice, she had a responsible party to answer therefor in damages."

The by no means uncommon practice of what amounts to the mere renting of space in department stores to individuals for various trade or professional purposes may get a serious setback from this decision. What appears to be a "department" may not be one at all, but representing it as such carries

with it all the liabilities commonly attaching to that business. The dentist, the oculist, the chiropodist, the manicure, the massagist or what not may be altogether too serious a burden for department store expansion to carry along.

BIBLIOGRAPHICAL.

ANESTHETICS AND THEIR ADMINISTRATION. A Text-book for Medical and Dental Practitioners and Students. By FREDERIC W. HEWITT, M.A., M.D. Cantab. London, Macmillan & Co., Ltd.; New York, The Macmillan Company, 1901.

We gave favorable notice to this book when, as a first edition, it appeared in 1893. The present volume is practically a new work, both in text, arrangement, and technical form. The author expresses misgivings as to the reception which may be accorded the second edition because of the radical changes which it embodies. Perhaps his intimate contact with the work in its evolution has prevented a full realization on his part of the improvement which the present manifests over the earlier edition. During the past eight years the scientific study of anesthetics and their physiological action has greatly added to our exact knowledge of the subject; moreover, the bulk of clinical data gathered during the same period has furnished a more extensive knowledge of their practical use. The many factors entering into the problem, the chemistry and pharmacodynamics of the agents used, the temperamental reactions of individuals both in health and disease, climatic and hygienic features, and various environing factors, all have important bearings; so that only systematic study, trial, and experience can furnish the means by which the safe use of these agents can be determined.

In dealing with these elements of the problem, Dr. Hewitt has, first of all, shown a masterly skill in systematically ranging them in their rational order and relationship. He has made a book in such a way that not only is the student furnished with an orderly and comprehensive treatise on the subject, but the data are readily accessible. The arrangement of the text is preceded by a diagrammatic key, which at a glance reveals the plan on which the work is built and which suggests a logical method for its study. The treatment is rational throughout, and a multiplicity of details is avoided, so that the reader is not confused in the attempt to master the subject. The author justly deprecates the lack of systematic instruction in this important department of surgical work, calling attention to the anomalous fact that "The examining bodies have not as yet made instruction in anesthetics a necessary part of the medical

curriculum,"—a condition which in some respects exists in this country as well as in England.

Of all the works on the subject we know of none which is better adapted as a text-book or which more clearly presents its subject-matter in a way suited to the needs of the average student than this one. It should be part of the literary equipment of every practitioner of medicine or dentistry.

OBITUARY.

JOHN W. SELBY.

DIED, July 19, 1901, at Atlanta, Ga., JOHN W. SELBY, in his seventy-third year.

Although not of the dental profession, a large part of Mr. Selby's active business life was closely interwoven with its progress. His personal relations with many members of the profession were of the most cordial and intimate character, more especially in the Southern States, where he was widely known and universally esteemed. So great was his personal popularity that he was elected an honorary member of the Southern Dental Association and of a number of the state dental societies. At the meetings of these he was always not only a welcome guest, but his counsel was sought even on purely professional matters and usually acted upon. It is fitting, therefore, that some account of his true and large-hearted life appear here in the archives of the profession for which and with which he labored so long and faithfully.

John W. Selby was born in Annapolis, Md., July 17, 1829. The place of his birth was on the present site of the Naval Academy, which land his father sold to the government. He was educated at St. John's College, Maryland, and was reared in the city of Baltimore. After leaving college he entered the wholesale dry goods business, and for years was one of the members of a firm doing a large business in that city.

At the time of the war he entered the Confederate army, and was enrolled in the Twenty-first Virginia Regiment, under Colonel Gillam. He continued in the Confederate service until the close of the war, when, having lost nearly all of his property, he went to New York city, engaging with Johnston Brothers, and later becoming a partner with Johnston Brothers & Selby, in the Baltimore branch of the business. After the dissolution of Johnston Brothers & Selby he returned to New York as manager of the New York dental depot of Johnston Brothers, where he remained until the organization of The S. S. White Dental Manufacturing Company, with which he accepted a position as traveling salesman through the Southern States. He was thus employed for many years, and came in contact with nearly every dentist in that section of the country.

When the Southern branch of The S. S. White Dental Manufacturing Company was established in Atlanta, Mr. Selby was placed in charge, and held this position until the time of his death. Under his wise management the business prospered. The patrons of the house were closely bound to it by ties of friendship with its manager,—ties formed through association more intimate than usually obtains under such circumstances.

Mr. Selby was at the time of his death an elder in the Central Presbyterian Church, in the affairs of which he had taken a very active part for years. He was also for a number of years superintendent of the Pryor Street Mission, his efforts in the interest of which were crowned with signal success, he having brought the membership up from a few members to one of the largest schools in the city of Atlanta.

Several years ago he organized a class for Bible study among the dental and medical students of Atlanta, which was non-sectarian in its character. The attendance was large from the beginning. Many a young man found a church home through this agency, and gathered from Mr. Selby's lectures on sacred history a wealth of information of which he had never before dreamed. These lectures soon brought Mr. Selby into prominence along the line of Biblical instruction, and his services as a speaker were in great demand. While he never claimed to be an orator, he had at his command a splendid knowledge of history gained from wide reading, and an easy flow of language, which gave his addresses a peculiar charm. The work done by him among the students and the marked good accomplished made his efforts the most productive perhaps of any he had ever undertaken. Besides the active part taken by him in church and Sunday-school work, he was a member of the Board of Directors of the Y. M. C. A. and of the committee for local home missions of the Presbyterian Church, Atlanta Presbytery.

An interesting incident connected with his earlier life occurred at the beginning of hostilities between the states. He was appointed by the citizens of Baltimore a member of the committee from that city which waited on President Lincoln with a petition asking that he use his mighty influence toward securing peace and urging that no more troops be sent south. Mr. Lincoln placed his hand on Mr. Selby's shoulder and said, "Young man, you display a noble spirit, but you have no idea what you are asking."

Mr. Selby was a man of fine presence, a finished, courtly gentleman in his manners; kindly and sympathetic in his intercourse with others; always ready to hold out the hand of helpfulness; a wise counselor, a firm, steady friend, upright and steadfast; a man to be loved and honored, as he was in many hearts, which are now sorrowful at his death.

Mr. Selby was twice married. By his first wife he had five children, only one of whom, Mrs. W. H. Keller, of the City of Mexico, is now living. By his second wife, who was Mrs. Eliza A. Badger, of Philadelphia, he had two children, Gerald and Dorothy, both of whom, together with his stepdaughters, Misses Margaret and Allison Badger, and his wife, survive him.

At a meeting of the Board of Directors of The S. S. White Dental Manufacturing Company, held Monday, July 22, 1901, the following resolution was unanimously adopted:

The Board of Directors of The S. S. White Dental Manufacturing Company with deep sorrow record the death of Mr. John W. Selby, late manager of the Atlanta branch of this company, who died, after an illness of several months, at his residence in Atlanta, July 19, 1901.

The most of Mr. Selby's business life was devoted to dealings in dental supplies. He was for a number of years associated with Messrs. Johnston Brothers, of New York, and was for a time a partner in their Baltimore branch. Upon the formation of this company in 1881, he became identified with it as its traveling representative in the Southern States, and when it was decided to establish a branch at Atlanta, no one was thought of for the important position of manager but Mr. Selby. His management of this

branch was admirable, and his business judgment was excellent. He was industrious, patient, and true; always an unselfish gentleman, whose winning manner and warm heart won for him hosts of devoted friends. It is safe to say that he will be missed and mourned by more members of the dental profession in the South than any one who was ever brought into business relations with it. He was much interested in and of great service to the dental societies of the Southern States, devoting himself to their interests, and aiding materially in their success.

His labors with and for young men, particularly those entering professional life, were untiring. His Christian virtue and purity of motive were strikingly manifested in the founding of a Bible class for the students of the dental colleges of Atlanta, where, for several years, he gathered every Sunday, during the college terms, an average of about one hundred students. He was also the superintendent and leading spirit of a large mission Sunday-school in Atlanta, which under his wise management has become one of the most successful institutions of the kind in the South.

Into all the affairs of life he carried the true Christian principles of earnest faith and unfaltering devotion to duty. He was inflexible in principle, tender and kind to the suffering; honored, esteemed, and loved by all who knew him. In his relations with his employes he was always kind and considerate, wise in counsel, and guided them with an influence that ever tended to make them honorable and upright.

By his death the management of this company have lost a wise counselor and an energetic and prudent helper, and the officers and directors mourn him as a devoted friend.

The board direct that this resolution be placed upon their minutes and published in the DENTAL COSMOS, and that a copy be sent to Mr. Selby's widow and children.

DR. JOSEPH F. HASSELL.

DIED, April 27, 1901, at his home in Lexington, Mo., JOSEPH FRANCIS HASSELL, D.D.S., in the seventy-third year of his age.

For four months Dr. Hassell had been a sufferer from malignant disease of the liver, and yet there fell upon the ears of anxious watchers no word or murmur of complaint.

He was born in Charleston, S. C., May 2, 1828, and his classical education was acquired in the cities of Baltimore and Philadelphia. He studied dentistry under Dr. Clark, of St. Louis, being a fellow-apprentice with the late Dr. Henry J. McKellops.

Completing his apprenticeship, he came to Lexington, Mo., in the year 1847. General Doniphan was at that time recruiting a brigade for service in the Mexican war, and, fired with patriotic zeal, young Hassell deserted his instrument case and took up the weary march to Mexico in defense of his country, serving until the close of the war.

Returning to Lexington he began the practice of dentistry, which was uninterrupted until the outbreak of the Civil War, when he enlisted in the army of the Confederacy. At the close of his enlistment he went to Lexington and there practiced until his last illness.

Drs. Stark (now deceased), Tindale, and Hassell were pioneer dentists of the West. Their field extended from St. Louis almost to the Pacific coast. At one time Dr. Hassell went from Lexington to a city in Mexico to construct a set of teeth for a wealthy Mexican woman. He traveled the entire distance in the saddle and received for his services the sum of one thousand dollars.

With the recognition of dentistry as a profession, Dr. Hassell attended the Missouri Dental College at St. Louis, graduating therefrom. After gradua-

tion he was elected to a chair in the school, but after a short time he gave it up, as it required too much of his time.

Dr. Hassell was a faithful, earnest, and honest man, always performing conscientiously the duties of his profession.

Dr. Hassell was married three times, his first and second wives dying in a short time, and on October 1, 1856, he was again married, to Miss Sarah E. Waddell. To them were born five children, of whom two daughters survive.

He was a most noble exponent of his chosen vocation and in his death the profession has sustained a great loss.

J. W. MENG.

DR. CHARLES W. HARREYS.

THIS prominent dentist of Brooklyn died suddenly of peritonitis at his residence, 632 Bedford avenue, on Saturday, March 16th. Dr. Harreys removed with his parents from Richmond, Va., to New York when he was quite a young man, and took up the study of dentistry with Dr. Ira Starr, with whom he remained for some years. He then opened an office in Brooklyn, where he continued in active practice for thirty years. He was well known professionally throughout the state, being a permanent member of the New York State Dental Society and of the Second District Dental Society of the Borough of Brooklyn, of which he was at one time president. Dr. Harreys was a member of Excelsior Lodge, F. and A. M.; Corinthian Chapter, R. A. M.; Masonic Veterans' Association, Fraternity Council, R. A., and the Reform Club, of Manhattan.

He leaves a wife and two children,—a son, Dr. C. W. Harreys, a physician of Ridgewood, N. J., and a daughter, the wife of Mr. Charles Eddy, of the same place.

Dr. Harreys will be greatly missed throughout the community. Being of a genial nature, he made many warm friends. He was a member of St. John's M. E. Church, and the funeral services were conducted by his pastor, the Rev. David G. Downey, Tuesday evening, March 19th, at 8 P.M., at his late home. Interment in Cypress Hills Wednesday morning, March 20th.

DR. NELSON W. WILLIAMS.

DIED, May 5, 1901, at Nice, France, Dr. NELSON W. WILLIAMS, in his sixty-seventh year.

Dr. Williams was born at West Liberty, O., October 23, 1834. He began the study of dentistry with Dr. Harris, of West Liberty, O., about 1855. During the succeeding five years he diligently prepared himself to enter the Ohio College of Dental Surgery; this he did in 1860. After taking one course he started practice at West Liberty, dividing his time between that place and Kenton, O. After two years of practice he returned to college, whence he was graduated in 1863. Shortly after this he entered into partnership with Drs. Jonathan Taft and George Watt, of Xenia, O.

In 1871 he was invited to enter the practice of Dr. Slayton, Sr., of Florence, Italy. This he accepted, going there in 1872, but after a year's stay in Florence he decided to go to Geneva, Switzerland, where he bought out the practice of Dr. George W. Field, now of London. After several years of hard work his health failed, and he had to go to the Riviera to recuperate.

Finding he could not endure the rigors of the Swiss winters, he decided to dispose of his Geneva practice, and locate at Nice, where he practiced until his death. He was a member of the Ohio State Dental Society and of the Mad River Dental Society, from both of which he received a specially gratifying testimonial upon his leaving Ohio for Europe. While at Geneva he was one of the five founders of the American Dental Society of Europe, and while failing health of late years had prevented his regular attendance at its meetings, he always had a warm place in his heart for its welfare and success, as was testified by his cheery letter read at its last meeting at Cologne. As a matter of history it may be interesting to note that Drs. Watt and Williams were the first to make crystal gold in the United States, and Dr. Williams was the one to introduce it to the profession in Europe, and he also showed his lamented friend Dr. de Trey, of Vevey, how to produce it, the outcome of which is the Solila gold of to-day.

Dr. Williams was the pioneer of American dentistry on the Riviera, and those who had a close acquaintance with him will sadly miss his kindly genial greeting, and will join with the wife and daughters who now mourn the loss of husband and father, in bowing to the stern fate that deprives them of a dear good friend, and our profession of one of its pioneers and most skillful and conscientious representatives.

He was laid to rest in the French Cemetery at Cancade, near Nice, in the presence of a great concourse of sorrowing friends and all the members of the French Dental Society of the Riviera.

DR. S. A. WHITE.

DIED, April 29, 1891, at his home in Savannah, Ga., from acute kidney trouble, Dr. SAMUEL ASBURY WHITE, in his sixtieth year.

Born in Charleston, S. C., September 30, 1841, his education was obtained in the schools of that city, and included a course in the Charleston Medical College. During the war he entered the army of the Confederacy, in the Fifth South Carolina Cavalry, a portion of Hampton's Legion, so active in the Virginia campaigns.

In 1866 he entered as a pupil the office of Dr. J. B. Patrick, of Charleston, S. C., and in June, 1870, moved to Savannah, where he continued in practice until disabled by failing health.

He was a member of the South Carolina Dental Association, the Georgia State Dental Association, being at one time president of the latter, and for several years a member of the American Dental Association.

His wife, formerly Miss Mary Isabella Glover, of Savannah, with three sons and one daughter, survives him.

DR. ARCH. C. HART.

DIED, May 28, 1901, at his home in San Francisco, from Addison's disease, ARCHIBALD COMBS HART, M.D., D.D.S., in the thirty-third year of his age.

Archibald Combs Hart was born in the state of Maine, January 14, 1869, and while yet an infant was taken by his parents to California. Of an active

and ambitious temperament, his thirst for knowledge was never satisfied. At twenty years of age he graduated from the University of the Pacific in San Francisco, and then after six months' pupilage in dentistry, in the office of M. L. Cooper, at Modesto, Cal., he came to Philadelphia, and matriculated in the Dental Department of the University of Pennsylvania, from which he was graduated in 1892. In November, 1892, he returned to San Francisco and began the practice of dentistry. While continuing his dental practice he attended lectures in the Medical Department of the College of Physicians and Surgeons, of San Francisco, from which he was graduated in 1897.

Dr. Hart was an enthusiastic and useful member of the following societies: California State Dental Association, San Francisco Dental Association, of which he was corresponding secretary and chairman of the Section of Microscopy; American Medical Association; California State Medical Society; California Academy of Sciences; San Francisco Microscopical Society, and California State Homeopathic Medical Society. He was also lecturer on stomatology at the Hahnemann Hospital College, San Francisco.

His interest in microscopy and bacteriology led him to the preparation of several valuable papers on the bacteriology of the diseases of the mouth and teeth, and in this imperfectly worked field gave promise of discoveries now doomed to disappointment. In 1898 he visited the East, and gave lectures on these subjects before several dental societies and dental colleges.

Dr Hart married Nella R. Lawrence, of San Francisco, September 5, 1894, and a widow and two children survive him.

The feeling of the profession is expressed in the following resolutions adopted June 5, 1901, by the Oakland Dental Club:

"RESOLUTIONS ON THE DEATH OF DR. A. C. HART.

"The Oakland Dental Club desire to express their great sorrow and deep regret at the untimely death of Dr. A. C. Hart, of San Francisco. The sudden ending of this life freighted with so much promise comes as a calamity to the dental profession at large, and fills every member of the Club with a profound sense of personal loss. The ending of a life which has run the due course of time allotted to man in this world, and which has been filled with the largest measure of usefulness to humanity, may be looked upon as a benediction; but our friend who has been so suddenly removed from earthly environment was but upon the threshold of a career which has not only already enriched science, but gave vigorous promise of much larger contribution from his continued research with the added power of a maturer mind, and we cannot therefore but grieve at the abrupt termination of a life so auspiciously begun; be it, therefore,

"*Resolved*, first: That in the death of Dr. Hart, the dental profession has lost one of its ablest, keenest, and most energetic investigators.

"Second: That his ardent, self-sacrificing experiments with the microscope have added much to the scientific knowledge of the pathological conditions of the oral cavity.

"Third: That his splendid reputation has been earned by careful, conscientious and painstaking effort, coupled with an honest purpose to do his best.

"Fourth: That we place a high estimate on his professional ability and personal worth, together with the work he had already accomplished through his assiduous labors for the dental profession.

"Fifth: That these resolutions become a part of the records of this Club, and that a copy of the same be suitably prepared and presented to Mrs. Hart.

"WALTER F. LEWIS,
R. W. MEEK,
E. C. TIMERMAN, *Committee.*"

DR. JEREMIAH L. FORDHAM.

DIED, suddenly, at his home in Scranton, Pa., June 28, 1901, Dr. JEREMIAH L. FORDHAM, in his seventy-first year.

Dr. Fordham was seventy years of age in January last, and had been a resident of Scranton for nearly forty years. His boyhood was spent in South Hampton, L. I. His academic education was received at Amherst College, Amherst, Mass., from which institution he was graduated. His professional education was received at the Philadelphia Dental College, from which institution he was graduated with the class of 1866. He had practiced dentistry in Scranton for nearly forty years, and had a reputation for being among the most skilled members of his profession in the United States. He was for many years, and until the time of his death, a prominent member of the Susquehanna Dental Association and a frequent contributor to its literary work and discussions.

He was a man of sterling integrity and high professional character, as well as attainment. His influence both by precept and example upon the status of the dental profession in Pennsylvania was always exerted toward the highest professional ideals. Modest and retiring in his manner, his counsels were sought in all that pertained to the welfare of the profession in his state, because of his recognized soundness of judgment, and his temperate yet forceful attitude upon all questions of professional policy. The death of Dr. Fordham will be lamented by a large circle of friends, and especially by his professional colleagues.

He was one of the foremost workers in establishing the Green Ridge Presbyterian Church, and the first superintendent of its Sunday-school, in which position he served for many years, winning to himself the affection and admiration of both teachers and pupils. His sincerity of purpose in this relation, as in all others, gained for him the admiration and esteem of all with whom he came in contact.

Dr. Fordham was twice married. His first wife was Miss Sarah Isaacs; his second was Miss Ada Pratt, who died about three years ago. Six children survive him, two of whom, Dr. Merritt Fordham and Dr. Walter H. Fordham, are practitioners of dentistry.

DENTAL LEGISLATION.

NEW DENTAL LAW OF CONNECTICUT.

GENERAL ASSEMBLY, JANUARY SESSION, A. D. 1901. AN ACT CONCERNING THE PRACTICE OF DENTISTRY.

BE IT ENACTED by the Senate and House of Representatives in General Assembly convened:

SECTION 1. There shall be a Board of Dental Commissioners to consist of five persons, all of whom shall be citizens of Connecticut, and shall be appointed and hold office in the manner in this act provided.

SEC. 2. No person shall be appointed a dental commissioner who shall not have been for at least ten years previous to such appointment a practitioner in dentistry in this state, and in good standing in said profession.

SEC. 3. Said commissioners shall appoint one of their members to be their official recorder, whose duty it shall be to keep a record of their official proceedings, and also to perform all duties required from him by this act; and also such other appropriate duties as may be required from him by vote of said Board of Dental Commissioners.

SEC. 4. On request of said Dental Commissioners, the Comptroller shall provide a suitable place in the Capitol at Hartford for all meetings of said commissioners.

SEC. 5. The term of office of each and all of the present Dental Commissioners shall expire on the first day of July, 1901, but they may be eligible for reappointment under this act.

SEC. 6. Before July 1, 1901, the governor shall appoint two qualified persons to be members of said Board of Dental Commissioners, who shall hold their respective office for two years from said date, and until their successors shall have been appointed and qualified; and he shall also, before July 1, 1901, appoint three persons to be members of said Board of Dental Commissioners who shall hold their respective office for four years from said date, and until their successors shall have been appointed and qualified; and every two years thereafter, beginning with the year 1903, the governor shall, before July 1st, appoint two or three persons, as the case may require, to hold office for four years, from the first day of July of the year of their respective appointment; and if any vacancy shall occur by death, resignation, removal, or otherwise, the governor shall by appointment fill such vacancy until the expiration of the term of the original appointment; and in making said appointments the governor shall select said Dental Commissioners from a list of not more than ten (10) duly qualified persons to be biennially nominated to him by the Connecticut State Dental Association.

SEC. 7. Said Board of Dental Commissioners shall meet in May and October of each year, and at such other times as they may designate for the purpose of attending to their duties as prescribed by this act, in their office in the Capitol building at Hartford.

SEC. 8. The commissioners shall give due notice of every meeting to be held by them pursuant to the provisions of this act by advertising the time and place of their meeting for two weeks successively in two of the daily papers published in said Hartford, and the second notice shall not be more than ten days before the date of said meeting.

SEC. 9. Said commissioners shall make such rules of procedure for the regulation of all matters brought before them as they may think advisable.

SEC. 10. No person, unless he had already commenced the practice of dentistry in this state prior to June, 1893, and was engaged in said practice on said date, shall practice dentistry in any town in this state unless he shall have first obtained from said Board of Dental Commissioners a license therefor; provided, however, that if the applicant shall have graduated from or received a diploma or other sufficient certificate of honorable graduation from some reputable dental college or medical college having a department in dentistry, and duly recognized by the state or states wherein the same is situated; such last mentioned applicant shall pay to the recorder a fee of ten dollars, and if he shall fail to obtain his license five dollars shall be returned to him; but every other applicant for a license shall at the time of his application pay to the recorder a fee of twenty-five dollars, and if such applicant shall fail to obtain his license twenty dollars shall be returned to him.

SEC. 11. It shall be the duty of every licensed dentist in this state who is engaged in the practice of his profession on May 1st in any year to cause to be filed in the office of the official recorder of the Board of Dental Commissioners, at some time between May 1st and May 31st of each year, a written statement signed by such dentist, giving his address during the year last expired to May 1st; also his (then) present address; also whether practicing alone or with others, giving also the name of the corporation, company, or individual with whom he is an employee, and such other

information as the Board of Dental Commissioners may require. It shall be the duty of the official recorder during the month of April in each and every year to send to every licensed dentist in this state, by mail, a blank form to be provided by the board, properly prepared with printed interrogatories thereon, for the convenience of the dentist in compliance with this section; and any dentist's failure to comply with the above requirements by the first day of June of each year shall be sufficient cause for a revocation of his license.

SEC. 12. All applications for such license shall be in writing and signed by the applicant, and no license shall be issued to any person unless he shall have received a diploma or other sufficient certificate of honorable graduation from some reputable dental or other college having a department in dentistry, and duly recognized by the laws of the state or states wherein the same is situated, unless he shall have spent as a pupil or assistant at least three years under the instruction and direction of some reputable dentist, or unless he shall have had at least three years continuous practice as a dentist, which fact must be shown to said commissioners by sufficient evidence.

SEC. 13. Nothing in this act shall be construed as preventing any lawfully practicing physician or surgeon from the performance of any operation in dentistry on any patient under his charge, neither shall any lawfully practicing dentist be prohibited from availing himself of the services of any pupil, student, or assistant employed by him and under his immediate supervision.

SEC. 14. Every applicant for a license shall be examined by said commissioners as to his professional knowledge and skill before such license shall be granted, and they may refuse to grant a license where they are satisfied that the applicant is unfit or incompetent; and they may for good and legal cause revoke any license that has been granted, and may prohibit any dentist in lawful practice from further practice on satisfactory proof that such dentist is unfit or incompetent. Any applicant for a license who, before his application therefor, shall have been duly licensed to practice dentistry in any of the United States (or District of Columbia) whose law provides for an examination by a Dental Commission before such license may be issued, may be licensed in this state by the Board of Dental Commissioners without further examination by them as to his professional knowledge and skill whenever in the opinion of the board an examination on these two points is unnecessary to enable them to judge of the fitness and competency of such applicant.

SEC. 15. Cruelty, incapacity, unskillfulness, gross neglect, indecent conduct toward patients, or any such professional misbehavior as shows unfitness on the part of the dentist shall be deemed sufficient cause for the revocation of a license or prohibition to practice as above provided; and whenever any complaint shall be made to any said commissioners against any dentist practicing in this state, said commissioners shall investigate the matter, and, on finding probable cause, shall notify the party complained of to appear before said board and show cause why he should not be prohibited or that his license should not be revoked.

SEC. 16. Every such notice shall be in writing, signed by the recorder, and shall contain a statement of the cause for which such prohibition or revocation is claimed, and shall specify the time and place for the hearing, which shall be at least twelve days after the service of said notice. Said notice may be served by leaving a copy thereof, attested by the recorder, at the place of business of the party complained of, or at his last usual place of abode, or by sending the same by mail.

SEC. 17. When any dentist has been notified to appear as provided in the last two preceding sections shall neglect or refuse to appear and answer, it shall thereupon become the duty of the commissioners to revoke his license and prohibit him from practice until he shall have appeared before them and have made satisfactory defense to such complaint; and such offending dentist shall pay to the recorder a penalty of ten dollars (\$10) for such neglect to appear unless the board shall find that such dentist was excusable for failing to appear, and in case any dentist shall continue to practice after having received notice from the

recorder that his license has been revoked, or that he has been prohibited from practice, he shall forfeit and pay to the recorder a penalty of five dollars (\$5) for each and every day that he shall have so continued unlawfully to practice; said penalties to be recovered by proper action brought in the name of the recorder in the City Court of the City of Hartford, and such dentist may be enjoined from practice by any proper court or judge at any time after such notice of revocation of license or prohibition to practice.

SEC. 18. Any dentist who is aggrieved by the action of the commissioners in the revocation of his license or prohibition from practice may apply to the Superior Court or the Court of Common Pleas next to be in session in the county in which he resides for a writ of mandamus, requiring them to revoke their decision if the same shall be found on hearing to have been erroneous. Such application for a mandamus may be served on said commissioners by some proper officer or indifferent person by leaving with the recorder at his usual place of abode a true and attested copy thereof within twelve days after said commissioners shall have notified such dentist of his decision.

SEC. 19. The recorder shall keep an accurate account of all moneys received by him under the provision of this act, and shall pay from the same all necessary expenses for stationery, necessary correspondence, and for actual traveling expenses of the commissioners when engaged in performing such duties as are required of them by this act; and he shall annually in April render to the Comptroller an itemized account of such receipts and expenses, and he shall keep all files, receipts, and records in his possession and deliver the same to his successor in office; and he shall also pay to the Comptroller some time in April in each year all moneys in his hands on the first day of April of each year.

SEC. 20. It shall be the duty of every licensed dentist to cause his name to be displayed legibly, on or beside the principal outer door leading to his dental office; and he shall also cause the name of every dental employee or assistant in the same office to be displayed in similar manner and equally legible.

SEC. 21. Every licensed dentist shall at the same time that he makes his annual report to the recorder, as required by Section 11, also report the name and address of his every employee, student, and assistant, and whether the same be a licensed person or not, and how long such person has been engaged in the office prior to May 1st of that year.

SEC. 22. Every licensed dentist making annual report, as provided in Section 11 *et seq.*, shall pay the recorder a fee of fifty cents, and the recorder shall make and preserve an official record of the same, arranged by counties, and the original reports themselves shall be carefully filed (by years) and preserved in his office; but nothing in this act shall be construed or understood as permitting any licensed dentist to avail himself of the services of any pupil, student, or assistant in performing any dental operation in any locality, building, office, or room separate and apart from the building, office, or room which the licensed dentist who is the instructor of such pupil, student, or assistant and immediately responsible for his operations makes his own daily and permanent office or place for his own regular professional services.

SEC. 23. Said commissioners shall make to the State Board of Health an annual report of their proceedings, in such form and at such time as such Board of Health shall prescribe.

SEC. 24. Any person who shall engage in the practice of dentistry in violation of the provisions of this act shall be guilty of a misdemeanor, and shall be fined not less than twenty dollars nor more than fifty dollars for each offense, and the unlawful practice of dentistry for one week or part of a week shall be deemed a separate offense.

SEC. 25. The act entitled "An Act concerning the practice of Dentistry," being Chapter CXXX of the Public Acts of 1893, and Amendment being Chapter LXXXV of the Public Acts of 1895, are hereby repealed.

PERISCOPE.

STERILIZATION OF DENTAL CARIES.—I have demonstrated previously the truth of the theory advanced by Dr. Galippe concerning the continuation of caries in spite of all the attention given in the preparation of cavities. All our efforts should be directed to the layer of dentin which lies immediately over the pulp in order to accomplish its sterilization and to prevent the subsequent resumption of the destructive process. This sterilization can only be brought about by adapting to dental practice the method used in histology for the preparation of tissues.

My *modus operandi* is as follows: First, I clean thoroughly the cavity to be filled, and wash the dentin several times with alcohol of 70, 90, and 100 degrees successively during half a minute, with a cotton pellet. I then dry the cavity with hot air and place in it a dressing composed of absolute alcohol, xylene, essence of geranium, and hydronaphthol, which I leave there for twenty-four hours. After this period I insert the permanent filling.

I have carried on a series of experiments which demonstrated conclusively the necessity (1) Of treating teeth to be filled in the same way as tissues intended to be sectioned are prepared in the laboratory; (2) Of the perfect sterilization of dentin. The following experiment has been performed: Two teeth that were to be extracted were treated, one by cleansing it mechanically and the other by the same method plus the operative procedure above referred to. In each of these teeth was placed for five minutes a pellet of cotton saturated with the mixture already described, to which methylene blue is added. The two teeth were then extracted and sections made longitudinally. In the first case, the coloring reagent remained localized to the walls of the cavity; in the second it penetrated all through the substance of the organ.

When such an experiment is begun anew, but without using the methylene blue, and leaving the dressing for twenty-four hours, the penetration of the hydronaphthol can be shown by means of acid nitrate of mercury, which colors the healthy dentin pink, and the dentin saturated with hydronaphthol a dark yellow.

To prove conclusively the perfect sterilization of the dentin, if a tooth be crushed (after having first been subjected to a flame and then wrapped in sterilized paper), and fragments of it be put in the different nutritive media used in bacteriology, no growth will result. Among others I have used tooth gelatin,* and the result has always been negative. On the contrary, if the dehydration has not been performed as indicated the nutritive media are always contaminated.

From the foregoing it follows that dental caries can be easily arrested, provided that the dentin is subjected to a preparation similar to that applied to tissues that are to be studied according to the current rules of histology.—*Dr. J. Choquet in Transactions of the Société de Biologie of Paris.*

HINTS, QUERIES, AND COMMENTS.

THE ATTACHMENT OF PORCELAIN FACINGS TO CROWN- AND BRIDGE-WORK WITHOUT REMOVING THEM FROM THE MOUTH.—I have selected the above for my subject this evening, as I consider it the most important that I could bring to the attention of this honorable body. And, again, as it is original on my part, I take great pleasure in presenting it.

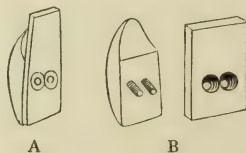
No doubt we all have had the same experience when such cases were presented to us for repairs. It was a question whether we should remove the work from the mouth and repair it, or attach the teeth with one of the different systems of nuts. I think you will all agree with me when I say such modes are long, tedious, and difficult.

My mode of procedure in such cases is: After removing all the porcelain

*See DENTAL COSMOS for October, 1900, p. 973.

from the backing, drill two holes through the plate at the place indicated by the old pins; enlarge these holes from the lingual side in a V shape. These holes should be considerably larger than the pins in the tooth, to allow of their adjustment.

After selecting a suitable tooth, fit it as the previous one was fitted; then tap threads on the pins of the tooth (I use Dr. Bryant's taps for doing this). Then take amalgam, without removing the mercury, and, placing the finger upon the lingual side, fill the V-shaped cavities and spread some amalgam on the floor of the backing. Take the tooth and press it into place; the pins will penetrate the amalgam in the cavities. After this hold the tooth firmly in place, and with a hatchet-shaped excavator pack the amalgam around the pins from the lingual side. When the amalgam has hardened, finish it.



I have here with me two cases. The one marked A is mounted, and the one marked B is as it should be before mounting. I also have the tap which I use for threading the pins.

I will not dwell long on the merits of this principle, as no doubt you can see its adaptability in such cases. It holds the tooth on without a strain, and should the pins not come through the center of the holes in the backing it makes no difference. Should you doubt its retention, I would advise you to mount a tooth in this way in your laboratory, and then try to remove it.

I will say, in conclusion, I have been attaching teeth in this way for nearly two years, and I have yet to find a case which has proved unsatisfactory.—DR. H. P. BOOTH, *West Superior, Wis., at the Duluth Superior Dental Association, April 12, 1901.*

AN OLD PATENT MEDICINE.—Through the courtesy of Dr. Geo. L. Parmele, of Hartford, we have been permitted to examine the declaration and specifications of an old letters patent, issued by the United States of America, under date of November 5, 1817. The document is upon parchment and is of interest among other things, from the fact that it is signed by James Monroe, President; J. Q. Adams, Secretary of State; and Richard Rush, Attorney-General of the United States. The signatures are autographs. The inventor, Joseph Utley, sets forth in his specification as to the composition and uses of his remedy, that

"It is composed of a decoction produced from the *Cornus florida*, or common dogwood, and the *Cornus sericea*, or red willow, otherwise called rose willow, by boiling, steam, and distillation. It is also composed of the wood, bark, roots, leaves, and flowers of these shrubs in their natural state, and of a powder produced from them by drying and pulverizing same. All of these remedies properly and safely applied will produce the desired effect. This composition of matter thus modified is applied to the gums with a brush after scarifying the same slightly with a sharp instrument. This application by contiguous sympathy overcomes the diseased action of the nerves of the teeth and removes the pain with which they are affected. For the cure of the scurvy in the gums and for fastening loose teeth by its astringent power,

the application is made without any previous scarification or incision of the gums, on account of their spongy texture produced by the scurvy.

(Signed) "JOSEPH UTLEY.

"Witnesses:

"PETER FARNHAM.

"JOHN CALDWELL."

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

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LIST OF UNITED STATES PATENTS PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING JUNE, 1901.

- June 4.*—No. 675,674, to FRANK RITTER. Elevating or lowering device for dental chairs.
 " *11.*—No. 675,881, to FRANCISCO CASSULLO. Artificial tooth.
 " *18.*—No. 676,465, to WM. LOWENTHAL. Rubber-dam holder.
 " —No. 676,487, to CHAS. BROWN. Abrasive sleeve.
 " —No. 676,488, to ARTHUR W. BROWNE. Self-oiling pulley.
 " *25.*—No. 677,268, to ROSCOE B. POWER. Dental instrument.

THE
DENTAL COSMOS.

VOL. XLIII. PHILADELPHIA, SEPTEMBER, 1901.

No. 9.

ORIGINAL COMMUNICATIONS.

PERSONAL CARE OF THE MOUTH.

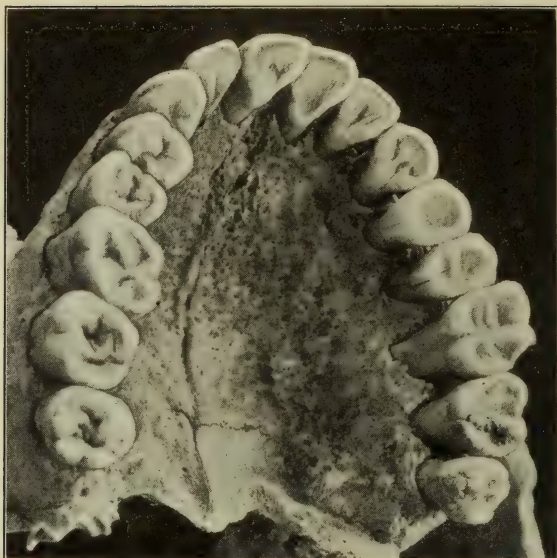
BY JOSEPH W. WASSALL, M.D., D.D.S., CHICAGO.

(Read before the Third International Dental Congress, Paris, August 8, 1900.)

NATURALISTS have distinguished man from the rest of creation, according to his various attributes, as a "two-legged animal without feathers," as "a two-legged animal who uses tools," as "a reasoning animal," and as "a cooking animal." His designation as "a cooking animal" would seem the most appropriate from the standpoint in which we view him for the purposes of this paper. All the ills to which the human denture is heir are directly traceable to that great epoch in his evolution which was marked by the discovery of an easy method of kindling a fire for the preparation of food.

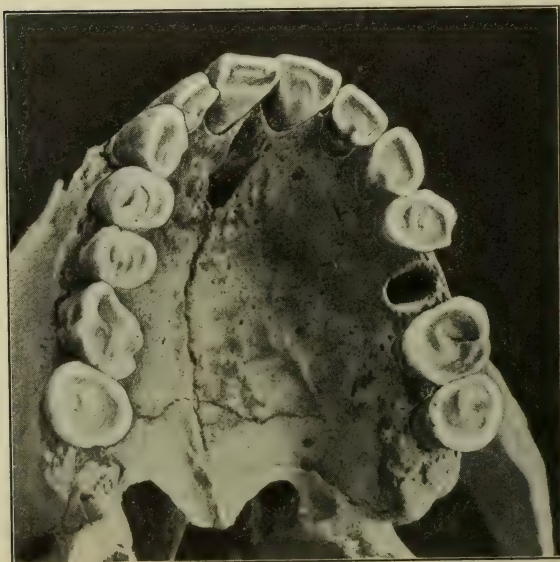
Modern man leads an artificial life. Anthropology teaches that nature intended *genus homo* should live in the wilderness; should spend sixteen in twenty-four hours out of shelter; that he should subsist on a coarse diet,—the uncooked flesh of wild animals, or upon the uncultivated products of the soil. The skulls of prehistoric savage people which are preserved to this day show that the teeth under such conditions of life were not subject to loss by disease. The teeth of wild men who survived to old age wore out. A fair estimate of the loss of tooth-substance by abrasion of mastication which should have occurred at the age of thirty years would be one-third of the crown,—i.e., the entire cusps and sulci of the molars and bicuspidis should have disappeared, with a corresponding pulp calcification; leaving the teeth to present their greatest areas of masticating surface in the prime of life, when the needs of the body are the greatest. At the same time a progressive recession of the gums has been going on, so that the teeth stand out

FIG. 1.



First degree of wear. (Enamel somewhat worn.)

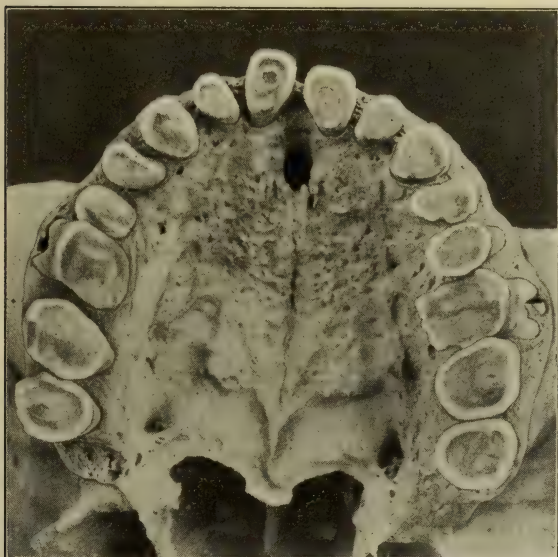
FIG. 2.



Second degree of wear. (Cusps disappeared and dentin exposed.)

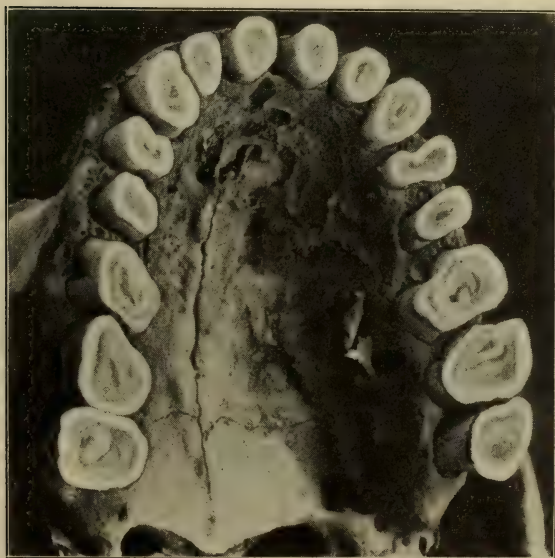
always at their required length. In the collection of crania made by Dr. Dorsey, and now at the Field Columbian Museum, Chicago,

FIG. 3.



Third degree of wear. (Teeth reduced in height.)

FIG. 4.



Fourth degree of wear. (Teeth worn to the necks.)

may be seen four skulls which admirably exemplify tooth-abrasion at different ages.

Instead of this normal wear, what conditions do we find in modern man? We see people every day, aged between thirty-five and fifty, who show scarcely any perceptible wear of the occlusal surfaces. The crowns are, therefore, abnormally long, and, furthermore, at this period of life there has occurred a normal recession of the gums. The malocclusion resultant from insufficient wear, as well as the greater leverage exerted upon the alveolus by reason of the elongated crowns causes a slight loosening of the teeth which frequently arouses fears in the minds of individuals lest the process should go on until the teeth are lost. In such cases it is only necessary to explain that the process is a perfectly natural and normal one. The duration of the teeth is not necessarily threatened, as at this age all the tissues have grown more dense.

If the mouth of a healthy dog be examined, the teeth will be found absolutely clean, and the gums in a condition of grisly hardness. You know already that this freedom from caries and loosening of the teeth is due solely to a diet which enforces upon the dog vigorous mastication. In other words, the laws of nature being conformed to, the parts are free from disease.

You are all well aware of the train of diseases which attack the mouth and teeth of the dog, cat, horse, cow, or other domesticated animals when fed for any length of time on food which permits even a slight deviation from what might be termed the normal amount of attrition. It is unnecessary to dwell upon facts so well known.

I claim that the human mouth should show analogous conditions to the mouth of the healthy dog. How is this condition to be attained and maintained? It stands to reason that at this late day we cannot advocate a return to the diet of a savage. The blessings of civilization are too apparent and too much appreciated. That an approximate state to that described may be established, I am convinced. It may be accomplished by a forced substitute for mastication of coarse food,—namely, the regular and strenuous use of hard-bristled brushes. The brushes should be made of the stiffest bristles which can be had. Very few brushes sold are fit for the purpose for which they were made. The brush known by dealers as “hard” is only suitable to bring the gums up to a point where *extra-hard* brushes can be employed. After “hard” brushes, so called, can be used without distress, the patient may be put upon brushes of extra-hard, unbleached bristles.

My method of training a patient to bring the gums to a physiological toughness may best be given, perhaps, by a hypothetical case.

Suppose we have for our patient an intelligent woman, aged thirty. We first examine the mouth. The case is an average one. We note on a diagram the location of ten approximal decays, three pyorrhea pockets (unknown to patient), two loose teeth, two overhanging margins of old fillings, redness of gum-margin on unused side of mouth, and a line of sordes of bacterial origin at the necks. Deposits of calculus inside all the lower teeth. The gums bleed

easily, and, as is usual in such cases, the patient tells us she uses a soft brush.

We will now begin the training of our patient by placing a mirror in her hand and showing her the condition of the gums and the location of the hard and soft deposits. You will then show her the region of the upper left canine, where we will suppose the gum-tissue is tough and non-sensitive. You will explain that, with her co-operation, it is possible to establish such conditions about all the teeth, and you then enumerate the benefits to accrue, which will be easily made obvious. The teeth are now scaled and polished, and, with another recourse to the mirror, the result shown to the patient.

We now describe a definite regimen for the personal care of her mouth. A positive manner should be used, with insistence on rigid observance of the rules. Upon this your success or your failure depends. The directions, with the reasons therefor, are as follows: Have always in use four extra-hard tooth-brushes, to be used alternately, because the employment of one only means its rapid softening by becoming water-soaked, defeating the object we aim to accomplish.

The brush, with a dentifrice, should be used at bedtime and in the morning, on arising. The brush should be applied vigorously and thoroughly for four minutes at each cleansing. This, you will observe, is twice a day only. We are particular to say the brush must be used no oftener and at no other time.

Hard-and-fast rules are the only effective ones in this work. If discretion is allowed the patient quickly grows lax, and quite unconsciously. The cleaning is to be done on arising, not at an hour later; and on retiring, not just before or after dining. If the teeth are properly cleansed on arising, they are freed from glutinous products of bacterial origin which have vegetated during sleep, and the food which is taken during the day is then not likely to adhere to them. What food does lodge in the interdental spaces may be dislodged by pick or floss. Any particles which remain do no harm where they are for the few hours until the bedtime cleansing, because the activities of the mouth during the day will hinder, if not entirely check, the growth of micro-organisms. The bedtime cleansing will, as far as possible, remove fermentable matters from the mouth which have accumulated during the day. Brushing with dentifrice may be supplemented with floss and antiseptic and alkaline wash. The dentifrice should be rubbed well over the teeth and gums by the brush, and then the brush should be dipped into cold water repeatedly, until all the dentifrice has been brushed out of the mouth, and then continued somewhat longer. Stress is laid on the need of brushing the gums vigorously, as well as the teeth. If the gums are well brushed, the teeth will take care of themselves. The brushes may cause bleeding, and develop sore spots on the mucous membrane for a few days, but a persistent brushing of the tender or bleeding places will soon harden and cure them. Lay down a rule that wherever the gums bleed or feel tender, there the brush is to be applied harder. The friction of the hardest brush

will, in time, become a pleasant sensation, and, indeed, an indispensable one. We may further explain that obstinate cases require patient perseverance and a Spartan courage, but it is surprising how quickly and kindly even aggravated conditions yield to what the patient may consider violent friction.

The brush cleanses, but, used in the manner here advocated, it has a far more valuable office in supplying the physiological needs of the gingival tissue, without which the latter cannot be normal.

The patient may now be dismissed, with strict injunctions to begin the new method that very night. The other appointments which are to follow will give you the oftentimes needed opportunity to reiterate directions and give encouragement. If you have been successful in creating and establishing the new conditions we have pictured, you will deem it the greatest service it is possible for you to render in your professional capacity.

Persons who show the most destructive conditions to exist in their mouths are frequently the ones most fastidious in their oral hygiene, even using the brush five or six times in the day, but a careful examination of the teeth-surfaces and the gums will show that the tissues really receive but a slight modicum of friction.

The application of the method under discussion to such cases will furnish abundant proof that five or six brushings per day in the ordinary way is taking the very worst possible care of the mouth.

In this connection, it may be in order to say something in regard to the various proprietary nostrums which the public so largely uses, and which are usually designated by the terminals "ines," "ols," etc. Apart from their very frequent injurious acid reaction, the habit of using such washes is harmful, because people are inclined to substitute them for a powder dentifrice or to even give up all brushing. The tendency under their use is to rely on their alleged antiseptic qualities, and hence to be less and less thorough with the brushing. So far as my observation goes, these washes are an unmitigated curse.

In closing, I may, under the circumstances, be excused for repeating what I quoted in a former paper from the pen of the late Dr. George H. Cushing,—viz, "that if it were possible to keep the teeth absolutely clean, there could be no dental caries." We might further add that the proper amount of friction upon the gums, either from mastication or artificially applied, would put an end to the ravages of that other enemy to the human teeth,—namely, pyorrhea alveolaris.

PATHOLOGICAL PROCESSES IN AN UNERUPTED TOOTH.

BY W. D. MILLER, D.D.S., M.D., BERLIN, GERMANY.

SOME time ago I obtained, through the kindness of my colleague Dr. Billings, in Malmö, a tooth showing various peculiarities which seem to me worth describing.

Dr. Billings inserted a set of teeth for a woman of sixty years who had been toothless for ten years, and had worn full upper and

lower dentures during that time. She wore the new set for a year without any inconvenience, but then a sensitive spot appeared on the hard palate, although no swelling or redness could be seen. By scraping the plate at the corresponding place relief was obtained. The sensitiveness returned several times during the following two years, but was cured each time by scraping the plate. At the last visit the spot appeared somewhat swollen and red, and on pressure a trace of pus appeared for the first time.

These symptoms led to the discovery and extraction of an unerupted canine, which showed the following peculiarities: The very small, normally-shaped tooth (see illustration) showed a circumscribed hypertrophy of the cement at the end of the root, and the whole root, with the exception of two small points, was covered with the dried-up remains of normal-looking pericementum. Near the apex of the root there is a deposit of olive-green (sanguinary) calculus, as shown in the illustration. This calculus cannot have been precipitated from the saliva, as it is separated from the neck of the tooth by an unbroken band of pericementum.



The changes that have taken place in the crown are very conspicuous. The whole cusp, excepting a small portion, is destroyed, and the cavity formed by the process shows a very rough, jagged surface. At the neck, on the labial surface, there is another deep, oval cavity having the greatest similarity to caries. On the distal surface there is also a large cavity, with sharp, jagged, undermined margins, which has penetrated nearly to the pulp.

Besides these large cavities, there are several smaller ones on the surface of the enamel. In all these the walls are coated with a substance of brownish-black color, by which the similarity to caries is all the more increased; indeed, so much so that a number of my colleagues to whom I showed the tooth recognized nothing more than an ordinary case of caries.

In reality, however, we have to do with a case of resorption, pure and simple, the discoloration of the cavity walls being due solely to dried blood, with which the cavities became filled during extraction.

So we have here another case which, without careful investigation, might very easily be mistaken for caries of an unerupted tooth,—an error which has often occurred and led to false views concerning the nature of tooth-caries. It is worth noticing that the process of resorption is restricted to the crown of the tooth, which may be accounted for by the irritation produced by the pressure of the plate upon the tissues immediately covering the cusp.

A POT-POURRI OF PRACTICAL HINTS: No. II.

BY JOHN GIRDWOOD, D.D.S. PA., L.D.S., EDINBURGH.

IN the practice of dentistry there is abundant scope for originality. There are few of its disciples who will deny that in it, to a greater degree probably than in any of the branches of medicine or surgery, is afforded a field for resource wide enough to satisfy the most enterprising. Its growth during the past twenty years is proof of this, and, without in the least discounting the ability of the men to whom this growth is due, it may truly be said of our profession that "necessity has been the mother of invention." Incidents and details of practice the treatment of which is to be found in no text-book are constantly presenting themselves to the dentist, and test to the utmost his inventive faculty. Many of these do not rise to the dignity of systematic dentistry, but they are none the less interesting and important on that account; and it is in the hope that such as I present may prove of use to the readers of this journal that I beg to record a few minor methods which have been useful to myself. I do so with no claim to originality further than that when I first employed them they were new to me.

1. *Foul Oxyphosphate Cement*.—It must be a matter of common observation that when a crown has for any reason to be removed, the oxyphosphate with which it was cemented smells foul, the odor being specially noticeable when the corundum wheel is applied in grinding. This is due to the porosity of the cement, which, though odorless when applied, becomes infected by the putrefactive bacteria of the mouth. The objectionable smell must be imparted to the breath, and is, it may reasonably be assumed, to be held accountable for the complaints of patients in whose mouths extensive crowning or bridging has been done that they have difficulty in keeping their mouths sweet. How far this can be obviated by the use of Leon Williams's and Ames's antiseptic cements there has hardly been time to prove, but it has been my habit for years to add to the cement powder before mixing about a tenth part by bulk of hydronaphthol powder. This drug has the effect of keeping the cement aseptic, and thereby preventing odor; and I have not found it affect the strength of the cement in the slightest.

2. *Treatment, by Crowning, of a Root in which a Post has been Fractured*.—This accident in crown-work is one which we are all called upon to face from time to time, and, while the simple cases are easy to deal with, there are some which are very complex. They naturally group themselves under two headings,—viz, (a) those in which the broken pin *can* be removed; (b) those in which the broken pin *cannot* be removed. The classical method of dealing with the first variety is to drill away the surrounding tissue until the end of the post is so well defined that it can be grasped with a pair of fine-pointed pliers, and by gentle but firm rotation and traction extracted. This, however, is not always possible; the fracture may have occurred so far up as to be beyond the reach of pliers. Other methods may be tried, and are sometimes successful, such as drilling a hole alongside of the pin and inserting a stout

excavator as far up as possible, and by working the post to and fro between the newly drilled canal and its original socket it may be loosened and drawn down.

These procedures argue a stout and steady root, and can only be applied where one has a fair margin of tissue to come and go on. This, unfortunately, does not always obtain, the mishap in question being as common in feeble roots as in strong ones. Some roots which can be made serviceable by crowning will not stand the strain that the above methods entail. Among them may be mentioned—(1) roots elongated with age; (2) roots supporting dentures; (3) roots naturally small in diameter; (4) roots impaired by caries. Even the smallest amount of vigorous handling may here end in such a disaster as splitting, permanent loosening, or even extraction of the entire stump itself. And, if these are to be avoided, extraction of a fractured pin ought not to be attempted.

How, then, are the requirements of such cases to be met? In these cases the following has been for years my habit of practice: I choose a trephine into the hollow of which the fractured pin will fit without injury, and by means of the engine carry it as far up as is considered expedient. Round the end of the fractured pin and into the groove made by the trephine a tube of English dental alloy is fitted and soldered to a cap and band, as in an ordinary Richmond crown. This device I have found to give the most secure grip with a minimum sacrifice of tissue. It will be noted that such a tube, band, and cap afford really a triple grip. First, the tube grasps the broken pin; second, the tube is held externally by the surrounding dentin, and, third, the circumferential band secures both. It will be obvious that such a tube is immeasurably better than a solid post of equal length, the latter being held *only* externally. The tube, further, need not be inserted over the fractured pin to any great depth, as would be necessary were a solid pin used. Its tight encircling of its broken predecessor makes it almost continuous with it, and enables it to utilize the anchorage of the whole length of the original post. The stability to be obtained from a tube only one-eighth of an inch long will be found, to those who have not tried it, to be perfectly surprising.

3. *Other Uses of the Tube-Post.*—Tube-posts, instead of solid ones, are often of great advantage in certain cases of crown- and bridge-work in economizing time and enabling the operator to proceed with the more permanent structural part of his work while the tiresome routine of root-treatment is in progress. When a root which is the seat of chronic abscess has to be crowned or utilized as a bridge abutment, and does not yield to treatment within a reasonable time, there is something to be said for subjecting it to a period of probation before finally and permanently sealing its apex. If such a probationary period is deemed necessary, the patient must obviously be without the appliance (crown or bridge) until the dentist considers he may safely proceed with its construction. To many patients this delay is irksome, and is particularly trying to those who may have come from a distance to have their work done, and who must have it done within a limited time owing to social or

business calls, but who at a subsequent date could spare time for thorough treatment. From their point of view, as well as from the dentist's, any plan which will shorten treatment is of the utmost moment. The employment of tube-posts in such cases I have found to be an excellent time-saver.

The making of the tubes requires no detailed description, and they are used in all respects exactly like solid posts. Two points should, however, be carefully noted: The one that the joint of the tube should be soldered along its *whole* length, as this is essential to procuring the maximum strength and rigidity from the hollow cylinder; the other that when once the tube has been so soldered its lumen should be filled with some substance which will prevent its being soldered up in the subsequent steps of crown- and bridge-making. For this latter purpose a splinter of orangewood dipped in asbestos and plaster paste and driven into the tube is probably the most efficient, but a spiral of stiff paper wound between the finger and the thumb and dipped in chalk and water, or a few strands of thread used in the same way, are equally good. These substances "cinder" under heat, and prevent blockage of the tube by solder; and when the work is finished and ready for the mouth they are easily washed out, leaving the interior of the tube clear. The strength of these tubes is, for all practical purposes, equal to solid pins, and they permit of the continuing of root-treatment after the crown or bridge has been set in the mouth, either permanently or temporarily, as seems best to the operator.

When any extra strain has to be borne, I have sometimes reinforced the coronal end of the tube by soldering a very thin section of tube about one-eighth of an inch long to the outside of the tube-post; but I have not been compelled to adopt this means of additional strength by any breakage or failure of the tube-post.

To prevent the apex of the canals being accidentally sealed by cement or gutta-percha, a small pellet of cotton dipped in an essential oil is placed over the apical foramen; the interior of the tube-post is lubricated similarly with oil. Any excess of cement or gutta-percha is thus readily withdrawn *while it is still soft* by a roughened broach or bristle, and the tube is finally cleared of all fragments and the apex left open by the removal, through the former, of the cotton pellet. When the root has been dressed to a healthy condition, it is sealed and filled in the ordinary way.

From the above it will be evident that the principle of root intubation in crown- and bridge-work brings within immediate and complete treatment (as far as the mechanical part of the work is concerned) cases which formerly could not be dealt with, much less finished, except under the most favorable conditions of professional attendance. Sometimes badly abscessed front roots have to be made immediately presentable, when to seal in a dressing for any length of time, much less put on a crown, would be dangerous. The patient may not be able to give for days or weeks the time necessary for thorough root-treatment, and yet has to have a crown or bridge put on. Occasionally, when beyond a dentist's aid, a root may require to have a dressing removed in order to prevent a bout

of inflammation. In all these cases the device of the tube-post tides over the difficulty, and I have even had patients continue root-treatment for themselves, or, at all events, keep a root thoroughly aseptic until such time as it was possible for them to come again to me, when I have first shown them how to remove and renew a dressing and given them the necessary implements.

In the crowning of roots whose apical foramina have become enlarged from persistent abscess or from other cause, tube-posts have a very markedly successful application. The great trouble here is obviously the sealing of the apex. In this primary and most important operation it is obviously difficult to know when one has gone far enough up the canal to finally occlude its upper end, and yet *not too far*. The caliber of root-canals lessens as one approaches the apex, and in many roots the opening by which the pulp enters is at the side of the apex, and not directly in the long axis of the root. These factors warn the operator when he should stop drilling and enlarging the canal by the increased resistance they offer to his progress, and they also prevent his pushing the sealing agent beyond the end of the root. It will be evident that when they are absent it is by no means easy to know, even by careful measurement, when one has pushed the sealing material up as far as he ought, and, even if one is sure of this, the difficulty of withdrawing the broach and of leaving the said material *in situ* is by no means slight. The dangerous results of a mistake at this juncture are too well known to need emphasizing from me. Any material pushed beyond the end of a canal leads to inflammation, and even air pushed up has a similarly disastrous result. Oxy-chlorid cement is very irritable, despite its antiseptic properties, and gutta-percha, either solid or in solution, also amalgam, are mechanical irritants.

With the use of a solid post it is impracticable to fix a crown before the apex has been sealed, without risk of pushing the cementing body or air through the apical foramen, but by the use of a tube-post such a thing may safely be done. The method I have used is as follows: A tube of suitable diameter is taken (I prefer one fairly large and thick), the end of which is tapered to fit the upper third of the canal so that the tube-post will go exactly to the apex. The completed crown or bridge may be confidently cemented without fear of untoward consequences. Air *must* escape through the apical vent, and if cement be used in excessive quantity it also will come down, and can be removed from the tube while soft. The tube may be filled and sealed like an ordinary canal as soon as deemed desirable.

4. *How to Crown an Incisor Root Outstanding from Normal Alignment.*—Roots which stand outside the dental arch offer many difficulties in crowning, the chief of these being esthetic. In restoring the crown of such a root one must, if possible, make an effort to bring it into line with the other teeth, and it will be at once apparent that the covering of the root-face is the main barrier to this proceeding. Suppose that we have made a Richmond cap, band, and pin, what shall be the next step? If we let down the

porcelain facing to the cap and finish it in the exact position of its natural predecessor, we only make the deformity worse, for no artificial substitute ever looks better than a natural tooth where, in point of position, size, etc., the two are as nearly alike as art can make them. If we incline the cutting-edge inward, so as to bring it into line with the adjacent teeth, and leave the neck outstanding, such can hardly be called an artistic success, as it gives the tooth the appearance of having been driven in. If we set the facing in correct alignment, we leave exposed a large metallic surface to catch the eye whenever the patient smiles. Such a case came to me a few years ago, and the treatment of it may prove interesting in this connection.

Mrs. W. came to have some lower teeth crowned. She was wearing an upper plate bearing right central and left lateral incisor and canine. The right central root was badly abscessed, and little more than half covered by the artificial tooth. To conceal the root by means of a tooth on the plate was impossible, and I determined to crown it as follows: The root was ground away well below the margin of the gum, except on the lingual surface, and the enlarged canal undercut to receive pink base-plate gutta-percha packed to force the gum away. This, repeated several times, permitted more to be ground off the root. A platinum band was fitted, capped, and a pin soldered with pure gold; cap, band, and pin being made as for a Richmond crown. The pin above the cap was ground off short; a tooth was selected, backed with platinum, and fitted to the cap in a line with the other teeth. The tooth was raised a little clear of the platinum cap, so as to allow body to be fused around and under it. The tooth was soldered on the lingual surface with pure gold, and the backing and pins flowed up and contoured as far as the very close bite would allow. Gum body of color to match the gum was flowed on the front part of the cap, and a little over the edge of the band in front. Porcelain was not used on the lingual surface, as, on account of the closeness of the bite, the coating would have been too thin to have afforded strength. The result, which was pleasing to the eye, could not have been attained on a plate, as the thin facing of gum body would inevitably have been fractured by the movement of the plate in the mouth, or by an accident in handling on the part of the patient.

A REVIEW OF ANESTHESIA: 1900.

BY DUDLEY WILMOT BUXTON, M.D., B.S., M.R.C.P.,

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(Read before the Third International Dental Congress, Paris, August 8, 1900.)

IN an assembly of surgeons no apology is needed for the introduction of any paper dealing with anesthesia. The advance of surgery has been pioneered by antisepticism, or, may I say, asepticism and anesthesia. We strive to do our best for our patients

without the introduction of alien factors which, while exercising a salutary effect in one direction, may prove deleterious in another.

Anesthetics lessen or abrogate shock, and so protect the nervous system,—the most important support in the “tripod of life.” It is in this way that the general anesthetic, by invoking unconsciousness, is superior to local agents which bring about only analgesia. The nerve strain involved when a patient’s central nervous system remains active while the peripheral nerve-fibers and end-organs are rendered insensitive is great, and cannot safely be ignored. The more highly differentiated nervous systems require greater protection than those less advanced in development. What obtains as we traverse the biological series from crude protoplasm to vegetable tissue and on through protozoa to vertebrata, holds equally true when we compare not only the races, but the individuals among races. The researches of Jolyet and Blanche have demonstrated that plant life passes into simple but temporary abeyance under the influence of narcotics. Among the more humble members of the animal series the same effect is met with, but with the ascent into the zone of life, when a nervous system becomes a central controlling mechanism, we find anesthetics revealing influences more profound and possessing capacities for evil as well as good.

The sleep of mere cessation of function then presses closely upon the heels of the dreamless sleep of vital extinction through destruction of the essential power of function in the medullary centers. Anesthetics, then, to perform their highest end must transitorily destroy peripheral sensation, and, while they compel abeyance of all intellectual faculties, should not interfere on the one hand with the vitality of the peripheral protoplasm, and on the other with normal performance of vital functions,—*e.g.*, respiration and circulation. After more than half a century, during which anesthetics have been employed, a very wide range of experience permits one to review how far the anesthetics now in use fulfill the requirements of the surgeon and yet protect the patient from catastrophe. One remembers with gratitude alike the labors of physiologists such as Paul Bert, Longet, Claude Bernard, Humphry Davy, and of practical workers, among whom were Crawford Long, Morton, Simpson, Horace Wells, Snow, Clover, Kappeler, Nunneley, Richardson, and many who yet survive to help forward our knowledge of anesthesia.

There appear to be two sides at least from which such a review as that which we propose to make may be regarded. It is possible to study the anesthetic purely from its physiological standpoint, and to determine whether it possesses the power of producing loss of sensation with abeyance of consciousness, with or without any tendency to encroach upon and finally destroy what we may be allowed to call the vital zone of the nervous system, the *naud vital*. But this aspect falls short of the requirements of the surgeon. To him it is essential that not only must he know what is the physiological behavior of an anesthetic, but he must also possess the key to the practical knowledge of how to apply the anesthetic in the work of the operating-room. There must be not only a clear mental picture of how the anesthetic behaves under the test conditions of the

physiological laboratory, but an accurate knowledge by what method the anesthetic can be employed to bring about in the case of human beings the ideal state of anesthesia for which the surgeon seeks. For example, it has been alleged by Richardson, and restated by Waller and others, that carbonic acid gas (CO_2) is one of the best anesthetics, both on theoretical and physiological grounds. When, however, we seek for practical methods whereby this gas may enter into the armamentarium of the operating theater, we find its use is impossible. It is a theoretical, but as yet an impossible, anesthetic.

And, again, there are among recognized and valuable anesthetics many which possess all the requirements of safety or of danger, according as they are employed in one way or another. We cannot with safety divorce the physiology of anesthesia from the consideration of the practical methods by which the anesthetics are used.

NITROUS OXID.—In point of interest, this substance takes perhaps the first place in the mind of the dental surgeon. As it was also the first gas or vapor employed in modern times to produce anesthesia, it has an additional claim to be considered first. Perhaps no chemical body has been more discussed and at the same time its physiological action more misunderstood than nitrous oxid. Briefly, it is held even now by many observers to produce anesthesia by causing a semi-asphyxial condition. Even so accurate an observer as the late Sir Benjamin Ward Richardson remarks, "It resembles carbonic acid gas in regard to the asphyxia produced by it." The last Sir George Johnson contended that its mode of producing anesthesia was in point of fact a beneficial asphyxia. It displaced oxygen from the blood, and when the tissues reached a certain point of cellular asphyxia they lost their power of receiving and conveying painful stimuli. Were such theories accurate, I have no hesitation in saying that nitrous oxid, so far from being the safest, would be the most perilous of all anesthetics, and its use would be attended in all cases by the greatest risk.

Paul Bert, that great scientist, recognized that the property of nitrous oxid was not to produce anesthesia by mere displacement of oxygen, but was that of a body itself capable of producing anesthesia by its specific action upon the tissues. He also recognized that this specific action was in most cases marked by the concomitant asphyxial phenomena incidental to the exclusion of air, which was then thought to be a necessity in its administration.

It is curious that this misconception has survived even to the present day. Even Professor Wood, of Philadelphia, in the course of a research on this subject, reasserts the old theory that nitrous oxid is an asphyxiant. Bert, however, found that he could produce anesthesia with nitrous oxid even when air or oxygen was breathed with it. His methods were cumbersome and have fallen into disuse, but his reasoning was correct and forms the keynote to our present knowledge.

In 1885 the writer of the present paper undertook a research to attempt to arrive at the true nature of the physiological action of

nitrous oxid. The results were read before the Odontological Society of Great Britain, and may be briefly summarized here.

(1) The nitrous oxid enters into a loose combination with the hemoglobin of the red corpuscles, and probably is so conveyed to the cells of the nervous centers.

(2) It exerts a specific effect upon the central nervous system.

(3) The phenomena of nitrous oxid anesthesia are totally distinct from those which occur in asphyxia.

(4) Upon the circulation, and more especially upon the heart, the effect of nitrous oxid is stimulating, except in so far as the introduction of any gas into the pulmonary blood circulation, if we exclude oxygen, increases the friction and so interferes in some slight degree with the circulation.

Having, then, substantiated that nitrous oxid was a specific and genuine anesthetic, it became a necessity to obtain some method whereby its introduction into the air passages should take place without necessitating the cutting off of the oxygen supply. Happily, this was soon to follow. Bert's plan being too elaborate, Hillischer was among the first to point out that with care oxygen could be introduced side by side with nitrous oxid and under normal pressures. Many methods to achieve this end have now been proposed, and to a fellow-countryman, Dr. Hewitt, we owe an apparatus which, though somewhat elaborate, yet answers its purpose extremely well. It is now admitted that nitrous oxid given mixed with air or oxygen is a practically safe anesthetic. It is a specific anesthetic, and is suited for all sorts and conditions of men. The complications and bad after-effects of nitrous oxid, when asphyxial phenomena are excluded, are extremely few, and are usually due to want of expertness in the use of the gas or to conditions in the patients which should have caused the use of the anesthetic to have been postponed.

Referring for a moment to practical points, I should like to speak of the deaths reputed to have taken place under this anesthetic. These have been extremely few. Richardson, in 1885, put them down as one in one hundred thousand, but his estimate is undoubtedly much too high. Some years ago I collected and arranged all such deaths as had been reported in the press. I found that most of these had followed some mechanical interference with respiration, such as the entrance of foreign bodies into the air passages. In one, for example, a tightly laced woman vomited, and the air passages became occluded. If we consider only such cases as are due directly to nitrous oxid gas, we have a very small class indeed to deal with. It is very important, however, to bear these in mind, for be it well understood that this anesthetic can, and eventually will, destroy the centers of respiration and circulation if allowed to act upon them for a considerable time while their blood-supply is too highly carbonized.

Upon *methods*, it may be said that many urge against nitrous oxid that its action is too evanescent, and so attempt to substitute for it bodies like bromo-ethyl, pental, or even chloroform. I venture, however, to say that this property is the most valuable one

this anesthetic possesses. It saves patients from the extremely dangerous multiple extraction of teeth, which was more common formerly than it is now.

When many teeth must perforce come out at one sitting, the operation assumes the dignity and demands the precautions accorded to a major operation in surgery. In such a case another anesthetic is called for, and should be substituted for nitrous oxid.

I venture to think that the attempt to introduce nitrous oxid into general surgery for operations lasting over five or ten minutes is a mistake, and is not wholly devoid of its special dangers. When, however, prolongation of the anesthesia is required for difficult extractions,—*e.g.*, impacted wisdom-teeth,—nitrous oxid can be given continuously during the progress of the operation. This is effected—(1) By nasal aspiration, (*a*) through a catheter passed along the floor of one or both inferior nasal meatuses, (*b*) by means of a nasal cap (Coleman). In this case the patient can be gagged in the usual way, and the mouth kept open, and even uncovered, while the anesthesia is induced and maintained through the nose. (2) By Coxon's mouth-tube, which "injects" gas to the back of the mouth. In this case it is best to close the nostrils with a clip, and maintain mouth respiration alone. I have obtained five minutes or more of placid anesthesia by these methods.

As a further proof of how mistaken were our views about the requisites of methods to produce nitrous oxid anesthesia, I may instance the most recent plan of giving the gas by the "open method." Many persons are greatly frightened by having a closed cap placed over their mouth, and to meet this Dr. Flux has taught us to overcome it by making use of the fact that, as nitrous oxid is heavier than air, we can pour it into a towel or specially designed mask which fits closely about the chin and cheeks, but is open everywhere above the level of the *alæ nasi*. Patients treated by this method fall tranquilly to sleep without being aware they are being narcotized.

With the swing of time's pendulum, many changes have occurred in the views taken about the relative safety of ether and chloroform.

ETHER has been accused of killing patients, not so much at the time of its administration, but of doing so by its after-effects. It is said it produces (1) lung trouble, bronchitis, pneumonia, pleurisy, and edema of the lungs; (2) hemorrhage into the brain by rupture of diseased arteries; (3) nephritis and anuria by suppression. The surgeon in some cases accuses it (*a*) of promoting hemorrhage during his operations, and so adding to the patients' risks; (*b*) of interfering with his manipulations by the rapidity of respiratory movements which follow its stimulating effects on the respiratory center; (*c*) of setting up vomiting, and so, more especially in the case of abdominal sections, of straining the suture lines.

The experience we now have, I think, enables us to say these objections are in most cases more theoretical than real. It must be conceded that the safety of the patient at the time of operation is

far greater when ether is given. Waller, working on isolated nerve, found that it was seven times safer, and clinical statistics show it to be at least thirteen times less dangerous than chloroform, even when cases are taken in which the administrator has no special knowledge. In the hands of professional anesthetists, ether is practically free from risk to the ordinary individual. When we consider the after-effects, we find that, in regard to lung complications, very few cases are authenticated in which bronchitis or pneumonia has arisen as a direct result of this anesthetic. It has been shown that under a prolonged administration of ether the body temperature falls from 0.5° to 3° C., and this itself predisposes the patient to chills. When the operating-room and all passages and hospital wards are properly warmed, we do not meet with "ether pneumonia." It is extremely rare in private practice where the patient is protected from cold.

The exposure of hospital patients, after prolonged operations under any anesthetic, is occasionally followed by lung complication. This is especially so in cases of abdominal section, when the patient's circulation is often enfeebled, the posture restricted to the dorsal decubitus, and the movements of respiration restricted by tight bandaging. The hypostasis which must supervene in these cases is the probable cause of the so-called "ether pneumonia" to which Dr. Drummond has drawn attention. Hoelscher has made some interesting experiments which explain the moist *râles* so common even early in ether narcosis. The coarse rhonchi in question are, according to him, the result of aspiration of mucus and saliva impregnated with ether, which become drawn from the mouth into the trachea. Eventually, if this secretion is allowed to enter in any large quantity, it will gravitate into the smaller bronchi and act as an irritant. It must be remembered, however, that the cilia of the respiratory tract are constantly working against this, and prevent in most cases any ether condensation entering the air-cells. Ether vapor *per se* probably never causes catarrh. The posture of the head is also important in this connection. If it is placed on its side, the secretion trickles out of the corner of the mouth.

Infection of the lungs by the pneumococci commonly present in the mouth may, in very debilitated subjects, arise through this aspiration, but I believe precautions such as I have mentioned will always prevent this occurrence. I have shown in a recent research undertaken with Dr. Levy that nephritis, albuminuria, and anuria, as the direct result of ether inhalation, can only arise when the ether is given in toxic doses. Cerebral hemorrhage arising after etherization I have never seen, but I recognize that it is better to avoid the use of ether in hemiplegics and those most prone to rupture of vessels. In my practice at the National Hospital for Paralysis and Epilepsy, I have always given chloroform. The reputed disabilities of ether, as well as its dangers, arise in a very large percentage of cases through inexpertness or the employment of a faulty method. It is important to avoid struggling in the early stages of etherization, and to this end it is best to commence the induction of anesthesia by the inhalation of nitrous oxid, passing on to ether

after the manner described by Clover. The supposed dangers of this method, the asserted liability to explosions, and so on, are mere mental figments, and never arise in the practice of competent anesthetists.

CHLOROFORM still retains its position as the most pleasant and most satisfactory of all anesthetics, from the point of view of the patient and the surgeon. There is, however, in spite of all our researches and efforts to avoid it, the extreme danger always present of its producing circulatory failure and neuroparesis of respiration. Deaths from chloroform occur in the practice of even the most expert, and in the case not only of the feeble and diseased, but more especially of those who are in full vital vigor and in the heyday of life. We now know that such deaths, when not due to carelessness and incompetence, arise through vaso-motor paralysis (Hill), whereby the patient's arterial system, no longer safeguarded by the tension in the arterio-capillaries, becomes depleted, the blood gravitating into the venous sinuses ("abdominal pool" of Hill), leaving the nerve-centers bloodless and the heart unable to maintain a circulation. McWilliam's research seems also to point to a further circulatory disability through the acute cardiac dilation, with loss of resiliency, which he believes occurs even early in chloroform narcosis.

These facts emphasize, if the terrible statistics of deaths under chloroform during dental operations require further support, that chloroform is not a right or appropriate anesthetic for the dentist's operations.

What has been said of chloroform applies in no small measure to bromo-ethyl and pental. They are bodies too uncertain and too powerful for evil to allow one to rely upon them in dental operations. They possess few if any advantages over chloroform, and are at least as dangerous. Had time permitted, I had hoped to have traced out the physiological action of these bodies, but I have already trespassed too long upon your patience.

A CASE OF CANCRUM ORIS.

BY J. C. MONTGOMERY, D.D.S., ELIZABETHTOWN, KY.

LIKE nearly all my friends in the dental profession, I knew very little by reading and nothing by experience in practice of that dreadful disease, *cancrum oris*. For the benefit of those not fully posted, I will give a short description of the disease as found by our best authorities before describing a fatal case which came under my care.

It is a very rare disease, and one of the most formidable of the diseases of childhood, generally occurring before the age of ten; and is most often found in feeble or ill-fed children or in those who are weak and debilitated from an attack of measles, scarlet fever, or some similar trouble that has reduced the vitality of the

child to a very low ebb. By some it is considered as a constitutional trouble, caused by a specific virus.

"The infiltration of pus and fibrin into the cellular tissue of the cheek proceeds with great rapidity until it becomes thickened and indurated. The skin externally and the mucous membrane internally present a tense glistening appearance. The exudation is sometimes absent, and the process is preceded by an anemic condition, during which the tissues present a bloodless appearance; this is followed by gangrene, without the usual precursory inflammation having set in, and is no doubt caused by the plugging of some of the larger vessels supplying the parts by an embolus or by a colony of bacteria." . . . "The mucous membrane of the cheek at the point where the tissues will first break down presents a dusky appearance, surrounded by a red inflammatory zone; the dark portion soon sloughs, and the ulcer thus formed presents a deep, ragged, irregular border, covered by a dark, ashy-brown-colored deposit." . . . "One of the products of decomposition is sulfuretted hydrogen; this gives to the breath a peculiar fetid odor. Death occurs in nine cases out of ten, and may result from pyemia, hemorrhage, exhaustion, and bronchial pneumonia."

The case that came to my notice was that of a little girl between nine and ten years old, the family being in good circumstances, the child well fed, and residing in a house which, with its general surroundings, was well kept. The family history, as far as could be ascertained, was good.

The child was brought to my office about March 21st, complaining of pain in the region of the lower left premolars, both being badly decayed. I scarcely knew which was causing the trouble, but, after tapping, concluded to extract the second premolar. The tooth presented the ordinary appearance of such teeth at that age. The patient left the office, and was not heard from for about two weeks. Her mother then met me and requested me to come and extract the other temporary molar, as the child was suffering from it.

Upon inquiry, I learned that in a day or so after her previous visit to me she had an attack of peritonitis, with serious symptoms, and at times her physician had feared grave results; but she was somewhat improved, so her physician, having arranged for some post-graduate work, left for the East. She then took somewhat of a relapse, and another physician was called. He noticed no swelling of the jaw, but on his second visit she complained of her jaw, so he suggested that I be called in. This was on April 2d.

On examining the mouth, I found the cheek somewhat swollen; the mucous membrane from the first premolar to the first permanent molar was sloughing, with a ragged, grayish-white ulcer about deep enough to lay an ordinary goose-quill in. The dead tissue holding together gave it the appearance of a sinus running parallel with the inferior maxilla from the first premolar to the first permanent molar. The ragged, grayish edge was surrounded by a hard red indurated border. The child complained of pain in the

bowels and jaw, wanted water every hour, and suffered somewhat from diarrhea. No great odor was noticeable. The affected part was washed with hydrogen dioxid, and listerine, fifty per cent., was left for a mouth-wash. The child was already on tonics and constructive diet.

The trouble rapidly increased, so that twenty-four hours after my first visit I resorted to silver nitrate to remove the decomposed tissue, and thereby lessen the odor, etc. By the third day the disease had progressed so rapidly that it extended forward to the temporary canine and backward past the first permanent molar, and had penetrated the cheek tissue so that I could pack iodoform gauze in a roll the size of an ordinary lead-pencil. This gauze was changed twice a day, the rough gray edges cauterized, and the parts thoroughly washed with hydrogen dioxid, the nurses washing the mouth out with fifty per cent. listerine every hour or whenever water or nourishment was given.

The skin over the affected part by this time had taken on a tense, smooth, polished appearance, which soon showed an inclination to become dry and peel off. The breath became more offensive, and the odor increased. By the fourth day the disease had extended as far forward as the lateral incisor and backward nearly to the anterior pillar of the fauces. A dark brown spot appeared on the cheek at a point about opposite the mental foramen, and this by the fifth day had begun to break down.

By the morning of the sixth day the wash thrown into the mouth came out through the opening in the cheek, the dark spot of decomposed tissue now being about the size of a nickel. This was removed by cautery and scissors, and the opening was packed with iodoform gauze.

The perforation increased rapidly in size, extending more rapidly in the directions presenting the least resistance. The mental foramen could now be plainly seen, there being no soft tissue or vessels showing in the foramen. The inferior maxillary was denuded from the lateral incisor to the first permanent molar, and down to the lower border. The disease had affected the mucous membrane back to the anterior pillar of the fauces, and rapidly extended toward the corner of the mouth. The patient was growing weaker, —taking less nourishment and vomiting whenever anything was taken into the stomach. Complained more of bowels and stomach than of jaw.

On the ninth day the orbicularis oris muscle on the side affected began to take on a pale appearance, as if the circulation was entirely cut off.

At 3.40 A.M. of the tenth day patient died of exhaustion.

In all, not over ten drops of blood, or practically no hemorrhage, was encountered. There was no noticeable increase in the saliva. The destruction of tissue was of sufficient extent to destroy the facial artery,—or, if it was not destroyed, its branches, the inferior labial, inferior coronary, and superior coronary, were obliterated.

CORRESPONDENCE.

A CHARGE OF PLAGIARISM.

TO THE EDITOR OF THE DENTAL COSMOS:

In the *Quarterly Circular* for June, 1901, published by C. Ash & Sons, London, I am charged with plagiarism, the article in question appearing in your journal for April last, and entitled "Porcelain Inlays by the Water-Bag Method." Here are the facts in the case:

Some time prior to the meeting of the Pennsylvania State Dental Society at Reading, July 5, 1900, I became the possessor of an Ash Inlay Swager. I was so favorably impressed with the possibilities of this little apparatus that I accepted an invitation to give a clinic before the state society for the purpose of demonstrating its usefulness.

The committee also requested that a brief account of the method be brought before the general meeting, which desire was also complied with. The clinic took place during the morning of the second day, and before the subject was brought up and discussed in the general meeting.

During the clinic, while no special effort was made to advertise C. Ash & Sons, mention was made over and over again that the apparatus was their production, and the clinician made no claim to originality. Several demonstrations of the method were given, each time to a new group of auditors, these being kept up until it was supposed that nearly every one present had seen the clinic. Having thus publicly disclaimed to be the originator, it was hardly called for to again repeat this disclaimer when explaining the method in an offhand way before the meeting,—especially when the apparatus was there and was passed around while this was going on. Considering that the water-bag method of swaging was generally understood, the term was used in its general sense, and with as little fear of molestation as when reference was made to the shot swaging apparatus, the inventor of which up to this time has made no protest.

In regard to the charge of plagiarism, I most emphatically deny any intentional transgression. The only literature ever in my possession was the circular of instructions which accompanied the outfit, which was more confusing than edifying; but finally I obtained some information from it which served a good purpose in assisting to describe the apparatus. Notwithstanding all this, the charge of plagiarism is without substantial foundation, as the following comparisons will show:

Broomell.

C. Ash & Sons.

"To make use of this device the cavity is prepared in the same manner as nearly as possible to the

"Shape the cavity without undercuts, as nearly as possible to the

Broomell.

ner as for inlay work in general; that is, without undercuts and the margins cut clear and without bevel."

C. Ash & Sons.

outline of a pear or other distinct form, so as to facilitate the fitting of the inlay when it is ready for insertion."

Considering that these two paragraphs are supposed to describe the same process, it would be difficult to word them more dissimilarly.

Broomell.

"The apparatus consists of four parts, a plunger, a soft rubber block or water-bag, a bed-plate, and a basal portion into which the other parts are fitted."

C. Ash & Sons.

"Description of Inlay Swager:

A—Plunger.

B—India-rubber block.

C—Plaster of Paris mold.

D—Bed-plate.

E—Section of base with hole in the floor for dislodging bed-plate, etc."

The above is correct, and no other description would suffice. The plunger is a plunger pure and simple, and no one would attempt to dispute the fact that the so-called water-bag or block is made of rubber.

Broomell.

"The rupture of the foil at the point of greatest strain is, however, not a serious complication, as it may readily be bridged over by the porcelain, and no harm will result during the baking process."

C. Ash & Sons.

"If the mold of the cavity be a deep one, the very thin foil that is used may be torn inside by the pressure, but this is of no consequence provided the foil is intact around the edges."

This common advice did not originate with C. Ash & Sons, and it is audacious for them to make such a claim. Since the inception of porcelain inlays, this feature has been recognized and referred to by all who have become proficient in this work, and it is impossible for the description to vary in any marked degree.

Throughout the entire double-column argument of the *Quarterly Circular*, not a single passage is found in which the description could be clearly given in any other manner. A process of manipulation and procedure was under consideration, and the aggressors in this instance might with equal propriety fling the charge of literary theft at Gray or Morris in their respective descriptions of the maxillary bones.

It is now incumbent upon C. Ash & Sons to retract this damaging accusation, and such retraction should be forthcoming at once and be as freely circulated as was the original charge.

Yours truly,

I. N. BROOMELL.

PHILADELPHIA, August 13, 1901.

PROCEEDINGS OF SOCIETIES.

THIRD INTERNATIONAL DENTAL CONGRESS, PARIS.

(Continued from page 918.)

FIFTH DAY—MONDAY, AUGUST 13, 1900—*Continued.*

SECTION IV.—GENERAL AND LOCAL ANESTHESIA.

THE president called the meeting to order and announced that Dr. E. MÜLLER, of Wädensweil, Switzerland, would read a paper on

THE USE OF LOCAL ANESTHETICS.

The following are the conclusions reached in Dr. Müller's paper: Local anesthetics can be used in conjunction with the arsenical treatment—

(1) To remove painlessly the dentin which covers the pulp; (2) for trephining teeth; (3) combined with arsenic to avoid the pain caused by the use of that drug; (4) to extirpate without pain the portion of the pulp which remains sensitive after the application of arsenic.

Local anesthetics should be used in connection with pulp extirpation in the following cases:

(1) In fractured or abraded teeth when there is no place in which to make the arsenical application; (2) when the pulps are inflamed; (3) when the dentist removes the crown of a bad tooth and the pulp is yet covered with healthy dentin; (4) when the region is inflamed and the patient desires that the operation should be concluded in one sitting.

The pulp can be removed by the following means: (1) By the simple application of cocain; (2) by means of cataphoresis; (3) by the application of cold and of cocain.

The disadvantages and inconveniences of this method are: (1) Sometimes it demands too much time, and cannot always be used without causing pain to the other teeth; (2) sometimes it is difficult to arrest the hemorrhage after the extraction of a living pulp; (3) it is more difficult to remove a living pulp than one that has been devitalized by means of arsenic; this is especially the case with the molars.

For these reasons, in the majority of usual cases, when we have to remove the pulp, it is preferable to use arsenic combined with the application of a local anesthetic, notwithstanding the well-known disadvantages of arsenical treatment.

Discussion.

Dr. RODIER. In the paper that has just been read mention has been made of but one anesthetic,—cocain.

THE PRESIDENT. Cocain and refrigerating agents.

Dr. RODIER. I would like to know the exact way in which Dr. Müller applies local anesthetics. Is it by subcutaneous injections or injections in the pulp? Cold anesthetizes the pulp; it remains

to be seen if cold is not too painful. If the patient can stand the cold a complete anesthesia will be produced, but I would like to know how he applies the cocain in order to produce the anesthesia of the pulp.

I do not think Dr. Müller has referred to arsenic as an anesthetic of the pulp. Is it to destroy or to anesthetize? Arsenous acid is not an anesthetic of the pulp. With a solution of alcohol at forty per cent., saturated with cocain hydrochlorid, a complete anesthesia of the pulp can be obtained, provided that it is applied on cotton to the exposed portion of the pulp, being healthy and not having undergone the changes following the application of caustics. If a gutta-percha filling is inserted over this cotton, excellent results are obtained.

DR. MÜLLER said that he used cocain for the complete removal of the pulp. He introduced a solution of cocain in the pulp, and then inserted a gutta-percha filling. He stated that this method was not original, and remarked that as so used the results are good. He sprays the root with ethyl chlorid; he then sprays the crown; then proceeds to the opening of the crown and sprays the root again with ethyl chlorid. Cocain is then introduced into the pulp, and in this way enough time can be disposed of to extract the pulp. He uses this method only with the incisors and bicuspid, not with the molars, because that is very difficult.

DR. D'ARGENT. I think that this question will be discussed again in Dr. Jeay's paper. At that time it seems to me that the discussion should be taken up again.

The president thanked Dr. Müller for his communication and Dr. Rodier for his remarks, and called on Dr. CH. JEAY to read his article (the conclusions reached in which are alone given here) entitled

THE SUPPRESSION OF SENSITIVITY OF THE PULP IN DENTAL OPERATIONS.

The author divided the agents of dental anesthesia into mechanical, chemical, and physical, and concluded as follows:

"To suppress the sensitivity of the pulp, which renders the excision of dentin insupportable, we have to make use of cocain cataphoresis, isolating the tooth, using alcoholic solutions, and very sharp instruments. In the absence of electrical appliances, hot air and saturated solutions of cocain or menthol in alcohol are, in our opinion, the only means that give good results without disturbing the physiological integrity of the dental pulp."

The next paper was one by Drs. PINET and JEAY, entitled

GENERAL ANESTHESIA WITH ETHYL CHLORID.

Dr. Jeay read only the conclusions of the paper, which here follow:

1. Ethyl chlorid is an excellent *analgesic*, just as is ethyl bromid.
2. It has an advantage over ethyl bromid in producing excitement in exceptional cases only, and even then it is very slight. The awakening is more rapid and agreeable, and without any bad feel-

ing. Vomiting is very rare, but, nevertheless, when we administer it we make sure that the patient has an empty stomach.

3. The anesthetic period is longer than that of hyponitrous oxid, and nearly equal to that of ethyl bromid.

4. It is a vaso-dilator, and brings about a slight congestion of the face. Notwithstanding this, in two cases out of fifty we observed at the awakening period an alarming paleness, which subsided after a short while. This phenomenon lasts only a short time, and seems to be the reaction of a too strong vaso-dilatation.

5. When given in analgesic doses, the heart and respiration remain undisturbed, although at the beginning the intensity and rapidity of the pulse are increased.

6. There is an advantage in giving it with a mask with two valves, so as to prevent the expired air from contaminating the vapors of the ethyl.

7. It should be given in the same quantity as when ethyl bromid is used,—that is, in analgesic doses, pupillary dilatation and mobility of the head and arms being sufficient signs that the right stage has been reached, otherwise a period of medullary excitement (muscular contractions), annoying and difficult to suppress, is reached. The anesthesia should not be carried to the point of suppression of the palpebral reflex. The average dose for an adult is from ten to twelve cubic centimeters.

8. The technique and appliances can be modified. The spraying through a wide canula upon a gauze compress brings about rapidly a sufficient freezing to produce a constant and rapid escape of anesthetic vapors; it is the cause of a loss of substance, and sometimes of failure.

9. The cold vapors being likely to freeze the velum palati, and also to cause paroxysms of cough in patients suffering from laryngitis, it would be a good thing to use tepid vapors. Experiments with appliances for this new technique are being carried on. As the results obtained are not very numerous, we will not mention them in this article.

10. The degree of safety of this anesthetic is between that of ether and that of hyponitrous oxid, and is due to its extreme volatility; but, on account of the very limited number of anesthetics as yet induced by means of this agent, one must be very prudent, and all the contra-indications of general anesthesia should be taken into consideration before ethyl chlorid is administered.

Discussion.

A MEMBER. I had occasion, in the Ecole Dentaire of Lyons, to make a series of experiments on ethyl chlorid as a general anesthetic. It is evidently a very good one, but should certainly be studied a great deal more before introducing it into daily practice. Then I think that it could replace hyponitrous oxid, especially when operations are performed at the patient's house.

Ethyl chlorid should be managed with care, as we are not well acquainted with it. I have had two experiences. In the first case

I gave the anesthetic, and a student operated. He had time to extract five lower teeth. The patient then began to awaken, and suddenly a facial paralysis, and something like syncope, occurred, a stop in the respiration indicating that the syncope was of serious character. I began artificial respiration, and after a minute the patient recovered, but nevertheless I had to keep her afterward for twenty minutes. An analogous case took place in my office.

As you see, these are not very serious accidents, but simply warnings which in certain cases, if we do not know the drug, might be sufficient cause of trouble to the dentist.

In conclusion, I will simply say that we should continue our researches. When we have sufficient statistics I believe that we shall adopt the ethyl chlorid, because it would be of advantage from the standpoint of general anesthesia.

Dr. JEAY. There is also the method of Dr. Brootbeck, which is a combination of suggestion with this anesthetic.

The PRESIDENT. Dr. Brootbeck gave us demonstrations. We were surprised to see the small amount of ethyl chlorid that he used; and suggestion combined with an analgesic, as ethyl chlorid, may be the means of performing ideal practical operations.

Dr. PONT. In Lyons, M. Polasson has made numerous experiments which prove that ethyl chlorid does very good service in certain cases. There chloroform anesthesia is not practiced, because they consider it more dangerous than ether. But ether has a great inconvenience. In certain persons it causes great excitement, and also because it takes too long to induce the anesthesia. Under such conditions M. Polasson began the practice of administering ether at first, following it with ethyl chlorid. He presented a communication on this subject to the Société de Médecine of Lyons. His experience comprises two hundred cases.

Dr. LOUIS TEANNERET. I would like to know how and when Dr. Brootbeck produces the suggestion.

The PRESIDENT. Immediately he speaks to his patient. He reassures him, and looks him straight in the face.

Dr. JEAY. It is also evident that with the ethyl chlorid there is no nausea, no uncomfortable feeling. In my little work, the strict observation of fifty cases, you will see that the production of an uneasy feeling has not been very frequent, although vomiting occurred in some cases. Is this due to overstimulation of the pneumogastric nerve or to an intoxication, as in chloroform? I do not believe that this last condition should be the cause, but we do not know anything definite about this question.

Dr. JEAY. To summarize, I will say that my experience comprises seventy cases. From these facts we have reached the conclusion that ethyl chlorid is a powerful analgesic, whose degree of safety is between that of hyponitrous oxid and that of ether. It should be administered as an analgesic, and not for a long time, for that might bring about medullary excitement. It is very characteristic to observe that often the patients begin to cry, and when they wake up they say that they did not suffer at all. Another thing that proves the good points of our method is that not one out

of the fifty patients to whom the anesthetic was administered suffered any bad results.

The PRESIDENT. We must thank Drs. Jeay and Pinet for their very interesting communication.

Dr. Viau, who was to read a communication, came to me a few moments ago to say that, owing to the various duties that have been imposed upon him by the Congress authorities, he has not been able to finish his paper. He hopes to do so in time for it to be printed.

Dr. HAMONET having described his vaporizer for ethyl chlorid, The president next called on Dr. GIUSEPPE BENVENUTI, Florence, Italy, to read a paper on "Peronin Applied to Dental Surgery." [This paper was not received with the report from Paris. It will be given in a later issue.]

Dr. Hivert then read a *résumé* (which here follows) of the paper by Dr. DARIN, entitled

HYPONITROUS OXID ANESTHESIA, ALONE OR COMBINED WITH CHLOROFORM OR ETHER, AND THE RELATIVE SAFETY OF THESE DIFFERENT PROCEDURES.

The first investigators were wrong to say that hyponitrous oxid was only an asphyxiating agent, for simple asphyxia does not produce insensibility, and the effects of asphyxia on the heart and respiration are very different from the action of the anesthetics.

The experiments and applications of the method of P. Bert (twenty per cent. oxygen and eighty per cent. hyponitrous oxid) have demonstrated that this gas is, on the contrary, the ideal anesthetic agent. This method has not become generalized on account of the complexity of the appliance necessary for its application. With regard to the mixture of oxygen and hyponitrous oxid at normal pressure, it must be said that it is very good to prolong the anesthesia in operations to be performed out of the mouth, but it is not very useful in dental surgery. The same can be said of the mixed anesthesia by hyponitrous oxid and by ether, according to the methods of Clover and Coleman.

Since P. Bert taught us how to administer chloroform, this agent does not seem to be as dangerous as ether, and if we administer it for one or two minutes before beginning the inhalation of the combination of hyponitrous oxid and chloroform the anesthesia will last twice as long. Given in this way in one-gram doses, the chloroform could not be the cause of any accident; and as hyponitrous oxid is nearly absolutely safe, no accident could occur.

The safe character of hyponitrous oxid does not justify its administration by persons who ignore the principles of anesthesia, and as much care should be used with this agent as with the less safer ones.

Discussion.

Dr. JEAY. I regret that Dr. Darin is not present, because all the experts in anesthesia admit that a drop of chloroform can cause death. Four or five drops in a compress have been enough to cause death.

Dr. HIVERT. I also regret that Dr. Darin is not present to answer Dr. Jeay's remark. I have seen him perform two thousand operations by this method. Besides the operations that Dr. Darin performs every week in the Ecole Dentaire, he gives the anesthetic by this method to his private patients.

Dr. JEAY. I know that it prolongs the anesthesia.

Dr. HIVERT. It avoids largely the dangers of chloroform. Now, it remains to be considered whether the accidents that you have observed were not due to hyponitrous oxid.

Dr. JEAY. Two or three drops of chloroform may cause death.

Dr. HIVERT. I have only read the *résumé* of the communication of Dr. Darin, but I can certify that he has performed from four to five thousand operations without the slightest accident.

Dr. PONT. I will repeat what Dr. Sebileau said yesterday, "In Lyons ether is the agent generally used"; and Dr. Darin brings us statistics of two thousand cases in support of his statements.

Dr. HIVERT. I will call Dr. Pont's attention to the initial syncope that he has referred to. Dr. Darin administers the chloroform after his patients begin to lose consciousness. He begins with hyponitrous oxid.

The PRESIDENT. He begins with chloroform.

Dr. HIVERT. No; he begins with hyponitrous oxid, and then administers chloroform drop by drop.

In consequence of these explanations, Drs. Hivert, Pont, and Jeay declared that they retracted their statements.

Dr. MORESTIN. I was a student in the Ecole Dentaire. Drs. Hivert and Darin, my teachers, administered hyponitrous oxid very often, and it surprised me to see the good results that they obtained. While I was a student of medicine I observed in the hospitals the period of excitement induced by ether, and also by chloroform. With hyponitrous oxid there is no period of excitement. It is an excellent agent; one whose administration is devoid of danger.

The PRESIDENT. We have to thank Dr. Darin for his very interesting communication. One thing I can tell you, and this is that a skillful operator has plenty of time to operate when using hyponitrous oxid. This agent is also of marked advantage to the patient, for no after-effects are experienced. It is evident that hyponitrous oxid is an excellent anesthetic.

The labors of Section IV have come to an end. I wish to thank you, gentlemen, for the attention with which you have listened to our papers, and for the importance which you have imparted to this section by your presence.

SECTION V.—PROSTHESIS, DENTAL ORTHOPEDIA, AND FACIAL RESTORATIONS.

Dr. CASE. As Dr. Martinier is not present, I will have to occupy the chair. Dr. J. G. BRIGIOTTI will now give us a description of his appliance.

Dr. J. G. BRIGIOTTI. On March 7, 1897, Mr. and Mrs. N. presented themselves at my office with their son, in order to consult me as to the condition of his mouth. They were very much grieved at

the condition of the boy. He was emaciated, nervous, and of melancholic disposition. Nevertheless his general state was not bad, and nothing had occurred to arrest development. His depressed condition was due to the fact that the child could not nourish himself properly, owing to the constant presence of dysphagia. His maxilla was too narrow, and closed within the lower jaw. It can be readily understood that under such conditions mastication was impossible. He could only tear his food.

On March 30, 1897, I began the treatment by the placing of a plate divided in the middle, to which jack-screws were adapted. My aim was to place successively several plates of gradually increasing diameters. The number of plates placed successively was ten. When an improvement was noticeable, I placed a new plate. This work lasted until August 6, 1897. I placed a permanent plate on that date, at which time the patient left the city. He returned in October, when I took the last impression. If we do not count the months that the patient was absent, it can be said that the treatment was accomplished in four months and six days. To-day the malformation is corrected, and he has regained his health.

Discussion.

Dr. POINSOT. I would like to make a few remarks; not on the operation which has been so well demonstrated, and for which we have to thank our *confrère* Dr. Brigiotti. I want to say a few words from a psychical point of view. It is impossible to imagine the importance of having regular dental arches. Irregular teeth depress the individual and affect his nervous system. I have seen many cases of nervous diseases rendered more severe, and maybe caused, by irregular teeth. To this cause I traced an attack of coprolalia in a person of quite unexceptionable family connections. This person had always used the most select language, when all of a sudden she began to utter most shocking expressions. I want to call your attention to the point that the dentist renders as great services to humanity as does the general practitioner.

The PRESIDENT. Do you use rubber for your appliances?

Dr. BRIGIOTTI. Yes; always.

The PRESIDENT. Did you take any precautions against the possibility of caries through contact of the teeth with the plate?

Dr. BRIGIOTTI. I examined my patient four or five times a day. I used to practice antiseptic washes continuously.

The PRESIDENT. In all the series of operations that I have performed, and that others have performed in my presence, it has always happened that the teeth, on account of the presence of the plates, have undergone disintegration. I have seen that the teeth decay in nearly all cases, and I want to call the attention of the profession to the necessity of covering the teeth hermetically. From this point of view, Dr. Brigiotti has realized a marked advance. The teeth were covered and have not suffered any bad effects.

Discussion closed.

Dr. POINSOT then read an article (an abstract of which follows) upon the

UTILITY OF ELECTRICITY FOR THE ANNEALING OF METALS.

Gold, platinum, iridium, and their alloys when electrically annealed are rendered more malleable, and acquire excellent working qualities. In the course of his experiments he discovered that tin, chemically pure, electrically annealed is rendered so malleable that it can be worked with as much facility as amalgam. It is of great advantage to use electricity for the annealing of gold foil intended for filling, inasmuch as it combines the distinctive properties of cohesive and non-cohesive gold. Gold thus annealed gives a perfect adaptation and a homogeneous condensation.

Dr. Poinsoot said the origin of his little paper, which was written nine or ten years ago, was this: One of my patients came one day to consult me with regard to the condition of his mouth. I examined the mouth, and I found that was affected with acute gingivitis, which made him suffer terribly. I also observed, besides this gingivitis, that his teeth were yellow and decalcified. I told him that it was absolutely necessary that he should masticate his food. In answer, he said that it was impossible for him to masticate on account of acute pain when so doing. I also noticed that the plate that he should have been wearing constantly was absent. I then learned that he would wear the plate for two or three months, and all of a sudden he would cast it aside on account of its becoming annoying and insupportable. I concluded that the saliva was extremely acid, and that in the presence of the copper contained in the gold it would decompose it, producing an electrolytic effect. Nevertheless the patient sometimes supported the appliance when his stomach, and hence his saliva, were in good condition.

I decided to make him an iridio-platinum plate, and in making it I encountered great difficulties in the matter of annealing. In order to overcome these difficulties I tried electricity, and the result was most satisfactory.

The PRESIDENT. Dr. Poinsoot is one of our distinguished *confrères* who is a master of his art. Everything he says is well thought out and studied. He wants to make us profit through his experience; we will have to read his communication very attentively. He is an authority on the subject, and he will be happy to know that you have derived profit from this lecture.

Dr. POINSOT. Mr. President, I thank you for your kind words. No discussion followed Dr. Poinsoot's paper.

The president then called on Mr. WM. BOOTH PEARSALL to read his article entitled "Oblique-Rooted Maxillary Teeth."*

The PRESIDENT. Mr. Booth Pearsall's work is of value to operative dentistry. It is thought that it is easy to extract teeth. From this work it will be seen that there are cases when it is extremely difficult, and in such cases it is necessary to know with exactitude the direction of the roots. Mr. Pearsall deserves much praise for his work, and we thank him for bringing to us the result of his observations.

*This article was printed in full in the DENTAL COSMOS for January, 1901, page 20.

Dr. L. RICHARD-CHAUVIN then read a short article (an abstract of which follows) entitled

A METHOD OF MAKING PORCELAIN CROWNS FOR UPPER AND LOWER MOLARS.

After bringing the tooth to a condition of health, the bottom of the pulp-chamber is made perfectly flat. A platinum or gold plate is prepared to fit this surface, and one to inclose the external surface of the root; these two are united by a median rod. This little appliance has the exact appearance of a stud. A saddleback tooth is then adjusted, backed, and soldered, and the crown is then ready to be set.

Discussion.

Dr. THOMAS RINSON. I have been practicing dentistry for eight years, and during that time I have placed plain gold crowns very often; and success has always crowned my operations. [In some paragraphs of Dr. Richard-Chauvin's paper the publication of which we have omitted, he had discussed the anti-physiological nature of gold crowns, and pointed out various evils brought about through their use.] Dr. Richard-Chauvin says that a space exists between the crown and the root. I make the crown in two parts. First I prepare the band—

Dr. RICHARD-CHAUVIN. We all make them in this way.

Dr. RINSON. And then I bevel the root and force the band to its position. I consider that a crown that does not hurt when it is placed on the root is one that is not well made. I think that with care a perfect adaptation can be obtained. I have in my mouth a crown that was placed nine years ago, and to-day there is no space between the root and the tooth. With regard to porcelain, I must say that it is better from an esthetic standpoint, but, as far as solidity is concerned, it seems to me that gold is better.

Dr. RICHARD-CHAUVIN. Dr. Rinson has spoken of the making of crowns. His method is the same as ours. I always recommend to make a band first, and to bevel the edges in order to obtain a thin edge. The point is that a foreign body is introduced between the gums and the tooth. I do not deny that the gums tolerate it sometimes. I am not condemning crowns in a general way.

Dr. RINSON. I only want to remark that the porcelain crown is not very resistant. I have also made this kind of crown, but I always had to go back to the old methods.

Dr. RICHARD-CHAUVIN. The tooth now passed around has been restored with one of these crowns. I told you that I have had failures, but the proportion is insignificant. The number would be greater if all-porcelain crowns were not used.

The next paper on the program was by Dr. A. ROLLIN, entitled

THE ADVANTAGES OF CELLULOID IN DENTAL PROSTHESIS.

The evolution in the use of organic substances in dental prosthesis seems to have followed the progress and improvements of the appliances at our disposal.

After a long and laborious period of work on ivory, rubber made its appearance. This material is now universally used, notwithstanding the numerous failures which were recorded at the beginning of its career. To-day, as if returning to ancient times, some among us regularly use *artificial ivory*,—that is, celluloid.

The results of a long experience with celluloid in prosthesis have persuaded me to inform you of the advantages that may be derived from the use of this substance. The title of the paper explains the object of this communication.

In 1876 the Albany Dental Plate Company sent to France samples of bases of artificial ivory. Before that time, in 1871, Oakley Coles already used it, and in his work on Prosthesis, translated by Varni, we find the description of a method which the author states gave him satisfactory results. He writes thus, "Celluloid is both stronger and lighter than any of the dental rubbers. It can be advantageously used for artificial dentures, as its pink color is of a natural aspect and harmonious with the color of the mouth."

Nevertheless, Oakley Coles recognized that celluloid presented some disadvantages, for further on in his book he states that it is attacked by the acids of the saliva, producing a strong odor of camphor, which is most disagreeable to the patient. Besides, if at that time celluloid was used with any metal it became opaque about the points of contact. These disadvantages seemed to overcome the advantages.

The difficulty of the technique was such that only thick plates could be obtained, and often after cooling the plate contracted to such a degree that the plate had its original form completely changed.

The making of plates with this substance was more of the nature of guesswork than anything else, and to those defects we had to add the imperfections of the material, such as the production of a strong camphor odor, which the patients could not stand, and the rapid disintegration of the substance, owing to the action of the buccal fluids. To-day all these inconveniences have disappeared completely; at least as far as our personal experience is concerned.

Plates that were made by us eight to ten years ago have been recently examined, and no alteration noted except a slight one in the primitive pink color. The odor of camphor has been suppressed from celluloid by means of special processes, and its passage through boiling water does not evaporate any of the camphor contained. Besides, the modification in the proportions of camphor and of gun-cotton used in the preparation of celluloid have allowed the manufacturers to provide us with an article which, while remaining elastic and compact, is more resistant to acids than the preceding ones.

For several years I have adopted in my practice a new celluloid, which has given me great satisfaction. Its solidity is superior to that of ordinary celluloid or vulcanized rubber, and is in proportion to its great elasticity. Its translucency and pink color are so close to the color of the gingivæ that our patients greet these appliances with their approval, as they seem to satisfy all the esthetic requirements.

The adhesive properties of this substance are of great advantage, for they permit of the construction of full dentures for mouths with very flat palates, as suction is readily obtained. Hence, through its lightness and easy adherence, celluloid could be considered as the ideal material for upper plates.

I also use a celluloid of ivory color, with which I can make the whole denture,—a convenient thing when the bite is very close. This substance can be used in combination with gold, as the adhesion between these two substances is very good. This permits of the covering of lower pieces with a layer of pink or white celluloid, which is more agreeable to the eye than the yellow and brilliant color of gold or that of rubber. I will add that the inconvenience formerly attributed to celluloid, of being attacked by antiseptic substances, does not exist at the present time. Phenic solutions or the solutions of weak acids have no action upon it. We have not observed the slightest alteration of plates belonging to patients who practice daily buccal antiseptis.

Our technique does not differ from that employed by our *confrères*. After selecting a base-plate of approximate dimensions, we trim the excess; this is what we call the *grosso modo* adjustment. We then submit the base-plate to the action of boiling water until the softening of the celluloid is such that it can be adjusted by means of slow and progressive pressure. These preliminaries must be made very carefully. They avoid the necessity of making grooves to receive the excess of material.

By means of this method we can make plates as thin as we desire. The time necessary for the making of celluloid plates is certainly one-third less than that demanded for a rubber appliance of the same type.

Lastly, the repairing, which formerly was very difficult, on account of not having an appropriate dissolving agent, is to-day greatly facilitated by the use of acetone, which permits of the repairing of a plate in very limited time (from half an hour to one hour). By means of this solution of celluloid in acetone two separate portions are easily and quickly reunited, and it only demands the time necessary for the evaporation of the liquid. The repair is solid, and only leaves a mark that is scarcely visible.

We believe that the advantages of celluloid in dental prosthesis can be summarized as follows:

1. All the disadvantages of the celluloid formerly employed, such as odor and alterations under the influence of the acids of fermentation, have now disappeared.
2. Greater solidity than that of vulcanite. The same is the case with its elasticity, for it is very malleable.
3. Greater rapidity in the making of the plates. It can be said that the time employed is about one-third less than for rubber.
4. Immediate, solid, and invisible repairing by means of acetic dissolution.
5. Special lightness of these appliances,—of signal advantage in the restoration of an extended bony portion. This statement is supported by the case of phosphor necrosis which I had the honor

of presenting to the Société Anatomique June 6, 1898, and to the Ecole Dentaire. The patient wears an appliance which replaces the anterior portion of the superior maxilla,—a region comprising eight teeth. The celluloid mass, although not being hollow, is lighter than a hollow rubber appliance would be.

6. This lightness, combined with the perfect adherence, permits the realization of an appliance with ideal suction in upper plates for very flat mouths.

7. It is hardly necessary to add that, from an esthetic point of view, celluloid pleases patients, and it has always given me great satisfaction.

I will conclude these remarks fully confident of the future of celluloid in dental prosthesis. Besides, I know that certain manufacturers have not remained inactive, and are making numerous essays with an analogous substance from which camphor would be eliminated, and which might be used instead of celluloid.

The PRESIDENT. This work is extremely interesting. This method is to-day better understood, and gives very good results.

Dr. F. NAGY, Geneva, then read his communication (an abstract of which follows) entitled

THE CHEMICAL SEPARATION OF THE PRECIOUS METALS EMPLOYED IN DENTISTRY.

If we examine the different products that we use daily in our profession, it will be found that very often a great portion of these products are nearly unknown to us. Our researches in the domain of the metallurgical chemistry of the noble metals have led us to this observation.

We use gold, platinum, and silver, and these are used alloyed or in combination with other metals, such as zinc, tin, and copper.

Let us examine first the methods employed up to date for the refining of noble metals, before describing our method, which is, according to our opinion, the easiest.

We will remind our colleagues that in 1780, in the Mint of France, nitric acid was used for the refining of gold. When treating an alloy of gold, silver, and copper with nitric acid, the silver and copper are transformed into soluble nitrates, and the unattacked gold remains in the bottom of the vessel. After this is accomplished, the question consists in separating the silver from the copper. To obtain silver from the solution, two methods can be used. The first consists in the plunging of copper plates into the solution; the silver will be deposited in the metallic state upon the copper plates in the form of a grayish powder. The second, which is just as simple, consists in the precipitation of the silver nitrate into silver chlorid by means of sodium chlorid. The precipitate is then washed, dried, and fused with sodium carbonate.

When following the first method, we must be sure before melting the silver that no copper nitrate is present. In order to ascertain this, after the silver is thoroughly washed with distilled water, a

few drops of ammonium hydroxid are added; a blue coloration will be produced if copper nitrate is still present. The gold, which remains in the bottom of the cup in the form of a brown powder, should be washed and melted with borax and saltpeter.

The method that we have just described, although seemingly very simple, is nevertheless too complicated for us, inasmuch as the action of the nitric acid upon those metals takes place only under certain conditions; as, for instance, the acid will not act if the proportion of silver in the alloy is less than seventy-five per cent. Before doing anything, we must ascertain the standard of the alloy or of the gold that we wish to dissolve. This examination demands the skill of a professional assayer, as the determination of the standard of the ingot is made by cupellation, or approximately by the touchstone. If the little gold ingot is not up to the required standard the fineness will have to be raised by means of the quartation process. This will necessarily happen, as the gold used in dentistry is of high standard.

Let us refer just in passing to the method of separation of precious metals, or of their refining, by means of sulfuric acid. This method is still very much used in Paris. It is more economical than the preceding one, but presents the same inconveniences.

A method described by M. Dodé, in 1889, is nothing more than a modification of Sage's process. Sage proposed, in 1802, to refine the alloys by dissolving them in aqua regia and precipitating the gold with ether. The eminent French chemist proposed to dissolve an alloy of silver and gold in aqua regia; the gold being transformed into a soluble chlorid, while the silver is precipitated in the form of silver chlorid. The operation is done as follows: The alloy is placed in a porcelain cup, and aqua regia, composed of four parts of hydrochloric acid and one part of nitric acid, is poured over it. The gold is transformed into a trichlorid of gold, AuCl_3 , which remains in solution, whilst the silver is precipitated as the silver chlorid. Now the gold is precipitated by a reducing body, such as oxalic acid or ferrous sulfate. This last compound is the most suitable; it is employed in preference to others by all professional assayers.

This method of separation with aqua regia is the most convenient one for our purposes, but we have to take into consideration that the precious metals that we employ for prosthesis undergo a transformation through soldering. It has happened to us very often that while refining old plates (alloys of gold and platinum) part of them underwent dissolution while the soldered portions resisted the action of the acids entering into the composition of aqua regia. Through experience we have acquired the certitude that a layer of oxid is formed upon the soldered portions. This layer is not attacked by the aqua regia. After numerous experiments and researches, we are now absolutely convinced that such is the case.

We will here divide our *modus operandi* into three distinct portions:

First. Treatment of gold filings.

Second. Treatment of *débris* and pieces of gold.

Third. Separation of the platinum from the other soldered metals without disintegrating the platinum.

Treatment of Gold Filings.—We will speak of gold filings containing gold, platinum, silver, copper, zinc, tin, together with iron from the file.

By means of a magnet the iron is removed. Then we weigh the filings, place them in a porcelain cup, and pour over them nitric acid, chemically pure. We immediately cover the cup with a piece of glass and leave it standing for a few days. Before removing the nitric acid, it is a good plan to heat the solution very slowly to ebullition point; after allowing it to cool, the acid is transferred to a glass vessel and sodium chlorid is added in order to detect the presence of silver. This operation is for the purpose of removing zinc and tin. The quantity of nitric acid to use is approximately from three to four grams for every gram of metal. After this the filings are subjected to the action of aqua regia for four or five days.

The quantity of aqua regia to use is four grams to one gram of filings. After four or five days the cup is slowly heated, in order to evaporate at least one-half of the solution. After this is done, there is added to the solution three times its volume of acid, and the whole is diluted with distilled water, when a solution of sodium chlorid is added. This will show us if any silver remains, as generally the silver is found in a precipitated form in the bottom of the capsule. After this the solution is filtered. This filtered solution is poured in a vessel with a double cock. It is important not to continue the operation until complete cooling. We then add to the solution about four or five grams of ether for every gram of metal. The ether will take hold of the gold, and will either come to the surface or else it will go down toward the lower cock, according to the quantity of gold used. The phenomenon which takes place is characterized by a brown coloration of the ether which has seized the gold. If the ether charged with gold is found in the lower layer, the upper cock is opened to allow the escape of the vapors of ether, and the lower to remove the ether containing gold.

The first operation is not sufficient, and the ether should be put back in the vessel and the operation above described repeated, for as long as the ether has a brown coloration it means that the solution contains gold.

We have as yet in the solution platinum and copper. To separate the platinum we proceed in the same manner as for the gold, with the only difference that instead of using ether as the precipitating agent, we use the essence of lavender in more or less the same proportions. Here we also observe a brown coloration, indicating the presence of platinum.

The solution is abandoned after all the gold, silver, and platinum are removed. Hence we find ourselves in the presence of two solutions of precious metals which we have to extract. If the quantity of metal is not great (say from ten to fifteen grams) the ether is allowed to evaporate in the air; then the rest of the liquid, to complete dryness. The residue, which is gold chlorid, is diluted

with distilled water and heated to ebullition point, adding an excess of ferrous sulfate, which will precipitate the gold in the form of a dark brown powder. The liquid is allowed to settle; the powder of gold is washed with distilled water, a little hydrochloric acid being added at the last washing. The powder is dried and melted in a crucible with a little borax and saltpeter. This melted gold, when poured in a small ingot-mold, is chemically pure,—1000 fine.

The essence of lavender containing platinum is completely evaporated, and, after removing the excess of acid, etc., the residue is diluted with distilled water and treated with ammonium chlorid, which gives a precipitate of platinum and ammonia. Calcined to redness, the precipitate is decomposed, and leaves a gray, spongy mass, which is nothing else than the platinum sponge which is for sale on the market.

Treatment of Gold Débris.—The method of treating this *débris* is the same as that for filings. In this case the gold *débris* should be heated to redness with the blow-pipe before subjecting it to the action of the acids.

Separation of Platinum from Other Metals without Attacking this Metal.—Our studies on platinum have led us to search for a way of separating it without dissolving it. Now, we have seen that a concentrated aqua regia composed of six parts of hydrochloric acid and one of nitric acid is required to dissolve this metal, but we have also observed that when treating gold *débris* first with nitric acid we can act upon that metal with aqua regia slightly concentrated.

According to these processes, we began our work by heating old prosthetic pieces made of soldered platinum, and then subjecting them to the action of nitric acid during ten or fifteen days. After removing the nitric acid, we treated them with an aqua regia, not concentrated, but composed of one part of hydrochloric acid to three or four of nitric acid, and we then subjected to the action of these acids our prosthetic pieces. Little by little all the solder dissolved, and the backings and clasps fell out. The platinum plate comes out intact from this operation.

Discussion.

The PRESIDENT. What do you do when you have but little particles of metal in the form of filings? I think that in such case it is not worth while to go to all the trouble as suggested by your paper. Your method would be of interest to metallurgists rather than to dental practitioners.

Dr. NAGY. I thank you for your observation. What induced me to read this paper is the fact that sometimes it has happened to me to buy crowns of 20 k. gold which were perfectly rigid. I assayed them, and found that they were made of pure silver, strongly galvanized with gold. Another point in this communication is that very often plates of 18 k. gold are very difficult to swage. In such cases the application of the method described will be enough to show any adulteration.

The PRESIDENT. I will take pleasure in reading your paper

again, as this question interests me very much. My observation was simply with regard to dentists.

The next on the program was a paper by Dr. B. PLATSCHICK, Paris, entitled

CONTINUOUS-GUM WORK.

The author begins by giving the definition of continuous-gum work. He then goes into the history of this variety of prosthesis, and, in order to show that as far back as 1728 the idea of replacing the lost dental organs and absorbed gums with gold plates covered with enamel was not unknown, quoting Pierre Fauchard, who, in his book entitled "*Le Chirurgien-Dentiste, ou Traité des Dents*," published in Paris in 1728, says, "When the gums undergo total or partial absorption the gold or silver plate must be more or less large, in proportion to the loss of gum-tissue. The small eminences that the gums form in the intervals of every tooth and the half-contours that they form from one tooth to another should be represented. The loss of gum-tissue is supplied by well-imitated gums of enamel, for they have the true color of natural gums." To establish the fact that Delabarre was the true inventor of continuous gum as we understand it to-day, he makes the following quotation from his book entitled "*Traité de la Partie Mécanique*," Paris, 1820, vol. i, page 225: "Construction of plates of mineral substance in non-interrupted series; Artificial gums inlaid between a metallic plate and the calliodontes." (These are simply the titles of two separate paragraphs in Delabarre's book.) He then quotes from Delabarre as follows:

"After mounting the teeth on a plate, I apply the paste just described* in the posterior surface of the teeth, also in the interspaces, in such a way as to only form two points of artificial gum in front and an inclined plane behind. When considerable sinking of the alveolar borders exists, pivots are first soldered to a swaged plate; then, after all the teeth have been ground to convenient size, they are grasped together by means of the little hooks which are fixed on their posterior surfaces, taking care that the masticating border is in harmony with the opposite denture. After this, solder is made to flow over. The piece is tried in the mouth; the defects are corrected,—a thing which becomes very easy, as it is not any more necessary to bend the pivots in order to give to the teeth the inclination desired; and I will observe in passing that this is very advantageous. Then a circular bar is soldered. This, while keeping the teeth in the right position, gives a surprising amount of solidity to the entire piece. Lastly, the space between the round border of every tooth and the plate is filled with earth [the porcelain

*[Delabarre refers to the following formula:

Porcelain paste, 7 parts;
 Calcined gypsum,¹ 1 part;
 White sand, 1-20 of the mass;
 Any oxid desired, 150 grams per kilogram.

Grind thoroughly.

—ED.]

¹The more gypsum is added, the more fusible will be the paste.

paste?]. These different pieces are backed before the enamel is applied, because cracks always appear at several places; but they are filled with more earth." Evidently Delabarre by the word solder means gold 1000 fine, for in the second paragraph, p. 39, of the book mentioned he says, "If the callodontes have been grasped and soldered with pure gold to a cross-bar of platinum, a certain quantity of the composition can be inlaid over them."

Hence the essayist insists on the point that Delabarre described, in 1820, a method for the making of continuous-gum work. This method consisted (1) in the construction of the framework, comprising a plate and a platinum bar uniting the teeth; (2) in filling the interstices between the teeth, and (3) in covering the metallic portions with a ceramic paste. Delabarre also tells us that after the first backing the cracks are refilled with new paste, and that it is only after the second backing that the enamel should be applied.

Delabarre's method did not become so much used as it deserved to be; probably on account of the difficulty of the work, but especially because of the defects of his paste, as also of the callodontes of Fonzi. Hence it can be said that the improvements in this line of work are not necessarily the result exclusively of researches on a new composition, but are rather the consequence of researches and of the progress realized in the manufacture of porcelain teeth, the composition of new pastes being very much the same as that of mineral teeth.

The essayist gives full credit to Dr. Allen for having introduced the composition still in use to-day, and also for improving Delabarre's technique, which had become inadequate on account of the differences introduced in the form of mineral teeth.

The improvements introduced by Allen were not enough to generalize this variety of prosthesis, owing to the extreme difficulty in constructing the appliances, as the burning of the paste demanded a very high temperature and special skill. The weight of these appliances, the frequency with which they break, the difficulty of repairing them, and the small number of cases to which this kind of work can be applied were all reasons against its becoming popular.

He then passes in review all the ovens that have been constructed up to date, and says these ovens, notwithstanding their advantages over the old ones, always present inconveniences, such as the smallness of the muffle, the bad combination of the system of heating, and hence the want of uniformity in the temperature and the cracking of the muffle, which allows the escape of gas and changes the color of the teeth.

Dr. Platschick then reviews the formulæ of Hunter, Allen, and Ambler Tees; describes in detail the technique of continuous-gum work, and concludes his paper by quoting Dr. Metwitz, of Vienna, who considers continuous-gum work as the proudest work of prosthetic dentistry.

Discussion.

The PRESIDENT. You have all heard the paper of Dr. Platschick; it deserves serious consideration. This method originated

with Dr. Allen, of New York. It has been neglected because it is a very difficult work, but with the improved materials that we have the results are very gratifying. We should all give attention to this subject. We thank Dr. Platschick for his communication.

Dr. MARTINIER. I just want to say a few words from an historical point of view. It is interesting to define clearly a point that was left in the dark by Delabarre. Dr. Platschick has proved that he was the first one to apply the continuous-gum work to practical purposes. Our *confrère* Platschick is a remarkable practitioner, and I would like to tell him what great satisfaction it has given us to listen to his communication.

Two other papers were also read in this Section,—one by Dr. MÜLLER, of Switzerland, entitled “Different Result as to Resorption in the Superior and Inferior Maxillæ respectively After the Extraction of Teeth, and the Inclined Articulation Resulting Therefrom.”* The other was by Dr. J. M. ALBERDI (an abstract of which follows) entitled

CAOUTCHOUC AND GUTTA-PERCHA.

Caoutchouc is a vegetable substance, having the distinctive characteristic of being extremely elastic. Its color is gray; opaque when observed *en masse*, and semi-transparent when seen in thin layers. It is impermeable to gases and to the majority of liquids. It is insoluble in water and alcohol; soluble with difficulty in ether, and more soluble in chloroform, benzin, and carbon disulfid; the last solvent acts to greater advantage by adding six to eight per cent. of absolute alcohol. Its density is 0.99.

The volatile oils, especially that of turpentine distilled through bricks, dissolve it very well with the aid of heat, according to Bouchardat's observations.

The dry distillation of caoutchouc produces an oil called cautchin, $C_{10}H_{16}$, which dissolves caoutchouc with facility. Caoutchouc can be easily cut with a wet knife, or with one whose blade has been previously greased.

Caoutchouc was first described by La Condamine, in 1736. It exists in a great number of vegetables, but especially in the *Hevea Guaianensis*, *Siphonia*, and other trees of this same family. The Indians obtain it by making incisions in the tree and collecting the juice and spreading it over clay molds. In these molds the layer is allowed to dry before more caoutchouc is added. Caoutchouc is used for many purposes, the manufacture of surgical appliances being one of the most important.

Sulfuretted caoutchouc was discovered by Goodyear in 1843, and independently by Hancock in England about the same time. The best vulcanizing method consists in plunging the caoutchouc in a solution of polysulfid of potassium of a density of 1.208 at the temperature of 140° C., and then washing it first with alkaline water and afterward with common water.

Plates are vulcanized at 157° C. or 315° F., but in some cases

*Dr. Müller's paper was not received in the report furnished to the DENTAL COSMOS.—ED.

they come out porous on account of the thickness to be vulcanized. In such cases more pink rubber than red should be used, and a proportion of three of pink to one of red will give satisfactory results.

Gutta-Percha.—Gutta is the Malay name for gum. It is a product of the Malay peninsula. It occurs in the sap of the *Isonandra gutta* of the Sapotaceæ, and also of other trees belonging to the same group.

Gutta-percha is a valuable substance in surgery. It is used for the filling of teeth, and also for the making of many appliances; and replaces the starchy bandage in the treatment of fractures. Its density is 0.97. It can also be combined with sulfur in the same way as caoutchouc, and can be used for the taking of impressions. As it is soluble in carbon disulfid, artists use it for the making of varnishes. These leave a coating of gutta-percha upon the surface of the objects to which they are applied.

Gutta-percha becomes charged with electricity very easily, and the electro-magnetic cloth used therapeutically is nothing more than a thin layer of gutta-percha. When dissolved in chloroform it takes the name of traumaticin, and is used for the treatment of wounds.

Gutta-percha is bleached in the following way: A solution of gutta-percha one part, and boiling benzin twenty parts, is shaken up with plaster, which is then allowed to settle. The supernatant liquid is then agitated with alcohol of 90 degrees.

Discussion.

The PRESIDENT. Does any one know the Spanish language enough to discuss this communication?

Dr. SUBIRANA. I do not speak French very well, hence I beg you to excuse me if I do not express myself correctly. Dr. Alberdi is a pharmacist who knows in detail the subjects of gutta-percha and caoutchouc. There is one thing in his paper that does not agree with my views on the subject. He speaks of pink rubber plates, which, in my opinion, would be too heavy in the case of upper dentures. On this account in large plates I incorporate pieces of charcoal, which is a porous body and which has not a sufficient weight to cause the dropping of the plate.

The PRESIDENT. I thank Dr. Alberdi for his paper, and I am glad that it has been read in this Section.

A MEMBER. For facial appliances, pink rubber is not advisable, as it has a bad odor, while red rubber has none.

The PRESIDENT. I do not attach any importance to the color of the rubber; the principal thing is that it should be perfectly vulcanized. If so, it will not undergo putrefaction. With regard to pink rubber, I never recommend it for upper plates. The piece would be likely to break very often, and it would also fall out of the mouth, as it is very heavy. As far as the odor is concerned, I would say that it may be caused by the mucous secretions of the mouth and nose, and would be perceived with any plate, pink or red.

SECTION VI.—DENTAL EDUCATION.

SECTION VII.—(a) HISTORY OF DENTAL ART; MUSEUMS.

(b) LEGISLATION, JURISPRUDENCE, AND DEONTOLOGY.

SECTION VIII.—HYGIENE AND PUBLIC DENTAL SERVICES.

[JOINT SESSION.]

Dr. GODON. At last Saturday's meeting of Section VI the discussion was not of an international nature. It was altogether national, as the entrance examination to our schools was the topic discussed. Statements were made with which I will have to deal again to-day. It seems that some members disputed the right of the schools to oblige the students to pass final examinations at the end of each year.

Dr. Godon then, after a thorough examination of the question, proved conclusively that the dental schools of Paris had the right to oblige their students to pass examinations.

Dr. CHAUVIN. In the session to which Dr. Godon refers the right of the schools to impose examinations upon their students was questioned, and I was among those who claimed that the schools could not force the students in an absolute way to pass their final examinations. If the students want the diploma of the school they will have to pass the examinations. But if they only intend to pass their examinations before the Faculty of Medicine, the school cannot force them to pass their examinations; but then they will have to take their inscriptions elsewhere.

We have students good or bad who at the end of their studies decline the honor of passing the school examinations, and, as we cannot force them to take them, we refuse them our diploma; and this is all that we can do.

Dr. QUEUDOT affirmed that we had not the right to oblige the students to pass yearly examinations. I did not agree with him, and my remarks were limited to what I just said. As far as the yearly examinations are concerned, I am convinced that we have the right to oblige every student to pass them.

Dr. ROY. I am very glad of the intervention of President Godon with regard to this discussion. In fact, at the last meeting of Section VI a discussion between the essayist and several members took place, principally because of certain statements which appear in my paper on "Dental Education." I regret that the director of a dental school should affirm, as Dr. Queudot did, that our students have the right to abstain from passing examinations.

The first point upon which I wish to talk again is the one concerning American legislation. Dr. Aguilar stated that in America the dental profession was free, and that the diploma gave the right to practice. From the tables prepared by Dr. Godon on the dental schools in the United States you will be able to see that, with the exception of just a few, forty-two states have laws which regulate the practice of dentistry. It is impossible to say that in a country where fines of five hundred dollars and imprisonment of sixteen months have been applied to illegal practitioners the practice of the profession is free.

I have another document that supports another of my statements that was contested. I said that in certain American schools the students did not treat patients before their third year of study. This statement was contested by Dr. Aguilar, basing himself on the fact that he is a graduate of an American school. I have with me the list of questions that I addressed to all the schools, and especially to certain persons that I thought were in a position to inform me with regard to the schools they had studied in. My *confrère* Dr. Joseph Mendel, who is a graduate of the Philadelphia Dental College, answered that the students do not treat patients until the third year. I have only said in certain schools, hence you see that I depend on the statement of a graduate of an American dental school. If it is not so, I am not responsible, but Dr. Mendel; and I would be very much surprised if this statement is erroneous.

Dr. SIFFRE. I regret very much that Dr. Queudot, the director of the school to which I belong, should not be present to answer my colleagues, but, as I was present at a meeting of the Council of Education in which the question of our right to make the students pass examinations was discussed, I am in a position to talk. There it was decided by the Inspecteur d'Académie that our examinations were in no way of an official nature; that if the students failed at the examination that they have to pass prior to the taking of the final inscription, they could nevertheless take this inscription. We have the right to send the students away, but we have no right to interfere with their studies because they have not passed an examination. It is regrettable that it should be so, but we have received formal orders in this respect.

The PRESIDENT. It is an error of interpretation. I have here documents which throw light on the question. I ask to be authorized to show my correspondence with the Inspecteur d'Académie. By this means the error of interpretation on the part of Dr. Siffre will be clearly shown. I ask to have these letters published.

Dr. SIFFRE. I demand, in the name of the Ecole Odontotechnique, to include the documents to which I refer.

The PRESIDENT. I do not doubt your word. The error originated with the Inspecteur d'Académie, who wrote to you, as well as to us, this letter. He based himself upon a right that I have contested, and from my investigation in the Ministry of Public Instruction, referred to in the correspondence, I affirmed our right according to the law and not to the impression of an inspector who had written an erroneous letter. It is not a simple assertion; I have the correspondence that took place in connection with this affair.

Dr. POINSOT. I will throw light upon the question by quoting an example. Following the demand of a group of students, the authorities of the school stated that they had the right to do whatever they pleased. The government made the following statement: "As public authorities we cannot interfere. The dental schools can do what they please; nothing obliges them to do one thing or the other. The dental schools are absolutely independent, provided (and this is their only obligation) that the examinations be carried on in a correct and convenient manner."

Dr. L. GUILLERMIN, Geneva, then read his paper (an abstract of which follows) entitled

NOTES ON SCHOOL DENTAL HYGIENE.

It seems to us that dental hygiene is sufficiently defined and important to warrant its subdivision into several principal groups. We can subdivide it in the following way:

General dental hygiene, comprising ethnology, the constitution of the soil, general buccal and dental treatment, dentifrices, etc.

Alimentary dental hygiene, comprising the composition of the water and the influence of food and beverages on the formation and conservation of the teeth.

Infantile dental hygiene (from birth to the seventh year).

School, military, and hospital dental hygiene.

Dental hygiene of the noxious trades, confectionery, manufacture of soda, of acids; also lead, mercury, phosphorus, alcohol, and tobacco poisonings.

Diathetic dental hygiene,—gout, diabetes, rhachitis, and during such diseases as fevers, anemia, dyspepsia, locomotor ataxia, etc.

Lastly, international dental hygiene: Organization of a permanent general council grouping the ethnological information, favoring the creation of clinics, and working to obtain the aid of the public authorities.

In this paper we will discuss *scholastic dental hygiene*. Dental hygiene in the schools refers to pupils from the age of eight to that of eighteen. It is the time of greatest general development; of the development of the nervous system; of the evolution of the genital organs. It is a period of special nutrition, and it is necessary that this nutrition should not be deteriorated, so as not to provoke by its derangement the development of acquired or hereditary predispositions (tuberculosis, scrofula, rhachitis). During this period the mouth should be properly cared for, either for the immediate treatment of caries, for the prevention of threatened irregularities, or for the establishing of a general treatment corresponding to the buccal semeiology.

In this connection, it may not be amiss to give you my opinion regarding the effects which the overworking of children has upon dentition. Up to the age of twelve or thirteen years, at least in well-ordered schools, overwork does not seem to be an aggravating cause of dental caries. The cavities present at this age are rather caused by faulty nutrition or else are the result of hereditary tendency, as, in fact, dental caries can be considered as an hereditary disease in the same way as tuberculosis, scrofula, arthritis, with the difference that in those diseases the specificity may not develop; the histological formation does not reveal anything abnormal, while in dental heredity the tooth is from the beginning, histologically speaking, of inferior variety.

These are the principal causes of caries until the age of thirteen or fourteen, after which time college work is also accountable. Many dentists have observed it: Chrétien, Dr. Harlan, Dr. Galippe, and others; it cannot be otherwise. A great hygienist, Dr. Ferrière,

of Geneva, has demonstrated the injurious influence of overwork over general health. Fonsagrives says that humanity is disappearing through the brain, and adds that it can be saved through the muscles, but that no time should be lost in doing it. Nesteroff, a Russian hygienist, has observed a great number of cases of scholastic neurosis, which is the beginning of neurasthenia of adults. There are many young pupils whose faces show the signs of fatigue and emaciation; the nutrition in such cases is insufficient, due to the overcrowded character of the programs of the schools. If their mouths are examined, very often it will be found that their teeth are attacked by progressive soft caries. This proves that the organism is lacking in phosphates, which is almost a pathognomonic sign of overwork. These caries are the cause of faulty mastication; insalivation is incomplete, and dyspepsia, with its sequelæ of physiological miseries, sets in.

Many times in cases of this nature we have advised the parents to withdraw their children from study and take them to the country, and in the course of six months or a year we have witnessed true recoveries. But it is not in our power to modify those programs, which are the result of modern demands. England is the only country that has combined school work and hygiene. It is a judicious example that the other nations should follow.

From what we have said it follows that it is absolutely necessary to take serious care of the teeth, of those organs whose integrity is so important for good nutrition. How can we obtain this result? Principally by the organization of dental inspections for the schools. First, because we shall inevitably find children who, through pusillanimity, indifference, or lack of funds, escape our beneficent action; and also because we shall be able to combine our observations with those of the inspecting physician, and from these combined efforts a great deal of good for the children would result. The physician has neither the time nor the means of examining their mouths.

The study of the buccal cavity reveals many morbid states of the organism, without speaking of the aspect of certain caries which often are concomitant with ignored osseous lesions, and of retarded dentition. We can often diagnose adenoid tumors from the shape of the palate; we can observe the absence of nasal breathing, erosions, certain odors *sui generis*, specific spots of purpura, leucoplakia, the tendency to abscesses, the paleness of the gums, and all the numerous signs of buccal semeiology. In the majority of countries medical inspections are organized, but very seldom dental services; and wherever these services exist, they are exclusively of a private character.

It is our opinion that dental services, because of their importance, should be officially organized in the same way as the medical services are, especially when one considers the double advantage that the children would derive therefrom. The dentist would communicate to the physician the result of his visits, and would attract his attention toward all the semeiological buccal signs that he would observe. But, unfortunately, governments generally show indifference in this respect.

Dr. Guillermin then described the way in which voluntary dental inspections were made in Geneva. These had to be abandoned because of the great indifference shown by the authorities. The results of these visits were nearly the same as those obtained by previous observers. Caries predominated slightly in girls. Many Italians attend the schools of Geneva, and among them he observed a smaller percentage of caries. Forty per cent. of the mouths did not contain any caries, as compared with twenty-eight per cent. among the Swiss pupils. Ninety per cent. had never used the tooth-brush; five and one-half per cent. presented more or less marked erosions, and only three and three-quarters per cent. of the children that were examined were attended by a dentist.

NEW YORK ODONTOLOGICAL SOCIETY.

A CLINIC was given by the New York Odontological Society on the afternoon of January 15, 1901, at the New York Academy of Medicine, No. 17 W. Forty-third street, New York city.

After the demonstrations, the several clinicians gave short talks on the subjects of their respective clinics.

Dr. J. E. HINKINS, of Chicago. I wish to explain how I manipulate this preparation of Dr. Kowarska's, who is from Russia. I have made use of this in about ten cases, and Dr. Harlan has also in a number; he using 155 celluloid to 500 acetone, while I use 80 celluloid to 200 of acetone by weight. The working is about the same. The thinner the preparation, the easier it is to manipulate, but it is apt to evaporate. I have employed it principally for the support of loose teeth, such as the lower incisors, and for bicuspid and canines. It has also proved of value as a temporary coating flowed over fillings in cervical cavities under the gum-margins, which are very sensitive to heat and cold. The method I have used is as follows: After removing all deposits, I apply the rubber dam and dry the teeth thoroughly; then I take No. A sewing silk and ligate the teeth together, thus holding them in position during the application of the cement. I begin tying with said thread at the first firm tooth, ligating all loose teeth until another firm tooth is reached. Most of the teeth are wedge-shaped. Down next to the cervical margin, where you want to put this silk, there is a space which varies from one-sixteenth to one-quarter of an inch. I make a continuous knot, so it runs from one tooth to the other. I begin on the first tooth, flowing the cement, which is of a creamy consistence, all the way around the tooth, packing it about the silk; then I treat each succeeding tooth to the end in the same manner, making a continuous band around each and joining all together. You must put it on about twice as heavy as you want the band, because it loses in evaporation. It takes about one and a half or two hours to set. I usually let the patient go, and allow it to set forty-eight hours; then when the patient comes in you can smooth it off and polish it with sandpaper or anything you wish. Where the gums have receded, I also use it there. I am disappointed that

the committee failed to have a patient so that I might give a practical demonstration.

Dr. WARDWELL. How long a time will that remain without any repair?

Dr. HINKINS. The first case I operated on was about three months ago, on the lower central incisors and cuspids. I saw said case just before I left Chicago, and it was in perfect condition. I found no shrinkage between the teeth. I took the smallest broach I had, but could not pass it between the celluloid and the tooth.

Dr. J. BOND LITTIG. In tying those knots, do you make it approximately?

Dr. HINKINS. Just as the case presents itself. That is left to your judgment.

Dr. F. MILTON SMITH. How far up on the tooth do you make these wraps?

Dr. HINKINS. That depends largely on the position of the tooth.

Dr. SMITH. If you have an overhanging bite, are they not in the way?

Dr. HINKINS. I have found no trouble as yet in such cases. I make it so that it is not too conspicuous, ligating the teeth very carefully, and seeing about where the fulcrum of the tooth is,—where would be the strongest place to apply it,—sometimes tying it zigzag, up and down, in order to get the best support.

Dr. SMITH. About how long would that last?

Dr. HINKINS. The longest time was about three months, as stated. When I was in Paris, I understood Dr. Kowarska, who used it, to say it lasted from three to five years, and that it did very good service. I had a number of these little sticks with the cement on and dried which I expected to bring with me, but they were mislaid. The cement gets quite hard, and you can polish it off nicely. Here on this board is some of it, put on when we first started this afternoon. It is hard and tough, and you can hardly break it. It is different from any cement we have had. It is almost insoluble in the organic acids. I have had it lying in lactic acid and nearly all the acids, and we could not observe any marked change.

Dr. SMITH. Where can it be secured?

Dr. HINKINS. Almost any place. The celluloid is chemically pure, and the acetone is almost pure. You want the celluloid C. P. with no impurities, otherwise it is of no use.

Dr. A. W. HARLAN, of Chicago. Will the doctor explain that this can be colored?

Dr. HINKINS. I will say that I am now working on some different materials to color this cement. You can use a certain percentage of carbon and get a very good color for many cases, but the acetone evaporates so fast that it disintegrated when several different preparations were employed to color it yellow; and if it disintegrates out of the mouth, it will in the mouth. Different-colored celluloids can be obtained at the art stores, but whether they are any good I cannot tell. The time is not far distant, however, when we will be able to get it in any shade to match the teeth perfectly; that is, in three or four colors. The carbon does not seem

to disintegrate. This is a new thing, and will have to be developed. I do not know what Dr. Harlan has done with it.

Dr. W. E. GRISWOLD, of Denver, Col., explained the construction and the advantage of his *removable bridge-work*.

Dr. HARLAN. The only thing that has a tendency to fix matters in the professional mind is iteration and reiteration, and the only reason I have anything to say now is because I consider that the *digestion of the pulp* in teeth is a matter of very great importance to every practicing dentist in the world. Ever since the discovery by Spooner, in 1836, that arsenic would destroy the pulp of a tooth dentists have been at work making instruments, inventing compounds, and trying methods for removing the pulp; and when they did not seem to be able to remove the pulp with the various forms of instruments and compounds, they experimented, and are still experimenting, with methods for preserving the pulp within the tooth so it will serve as a filling perhaps,—at any rate, obviate the necessity for its removal after it has been destroyed. There are some single-rooted teeth which it is perfectly possible to poison with cocain so you can extract the pulps, and there are some multiple-rooted teeth where that can be done; but there are many with triple roots, and some single-rooted teeth, where the pulps are flattened and placed in tortuous canals where no amount of instrumentation has been able to positively remove every fragment of the dead pulp. The studies that have been made with papain and peptic products and substances capable of disintegrating animal tissue are probably entirely familiar to you. The thing I am presenting, and on which I have already read a paper, is the method of digesting dead pulp-tissue, no matter whether it has been in the presence of arsenic, chlorid of zinc, carbolic acid, creasote, any of the oils, alcohol, chloroform, ether, and substances such as are liable to be introduced into a pulp-chamber or a pulp-canal. For nearly three years I have been digesting the pulps of teeth in my practice, and also in laboratories in teeth that were planted in paraffin, in peppermint water, and various methods so as to keep them at a normal temperature, 98.4° or $98\frac{1}{2}^{\circ}$ F. After discovering that I could digest the pulps of teeth in teeth outside of the mouth, I found it was much easier to digest them in the mouth. At first, I only used papain, and it did not seem to do very well; finally I concluded from numerous experiments that papain, glycerin, and hydrochloric acid in about equal parts appeared to possess all of the desirable qualities of a pulp-digester, and when this paste was sealed within a tooth after a portion of the pulp had been removed, the bulbous portion particularly, that at the end of two, three, or four weeks, or even longer if necessary, the pulp would be completely liquefied and turned into a jelly-like substance, and in some instances, after seven or eight weeks, it had completely disappeared, so there was nothing to be found of it. I have noticed that in two or three instances of the digestion of the pulp of inferior molars. It causes no pain, and there is no putrefaction. There is no secret

about it. It is free to everybody, and it is composed of such simple ingredients that any man can make the paste at any time he desires. Take one grain of pure papain and one drop of chemically pure glycerin and a 1 : 300 solution of hydrochloric acid (but, as I said in the other room, when I have a large mass of pulp to digest I make it 1 : 50) ; make that into a paste and pack it full into the pulp-chamber. Use a shred of cotton if you wish, but no other drugs. Then fill the cavity with oxyphosphate of zinc, and let the patient go about his business. The pulp must be dead ; if one part of it is alive, it will not digest it,—it has no effect on living tissue. I think it is perfectly safe, and it is preferable that this should be allowed to remain in a tooth two weeks before removing it, and at the end of that time, if the bulk of tissue is not too great, you will find it completely liquefied, so you can wash it out with boric acid or carbonate or bicarbonate of soda, or anything you wish to use. If the pulp has been treated with a mild alkali after it has been destroyed, it does not impair the efficiency of this paste, because it will act in the presence of an alkali or an acid. Again (I am not quite certain of this statement for all cases, but in eight or ten that I have had it has proved true) : where you have a putrescent pulp, and there has been evolution of gases there, you may open the pulp-chamber, allow the gases to escape, use a dilute chlorid of zinc to get rid of the odor, and pack the paste into the chamber without disturbing the old pulp or using any pressure to force the contents beyond the pulp-chamber into the apical space and cause trouble ; cover it with a little oxyphosphate of zinc, so that when the patient closes his teeth he will not hit against the covering, and let the patient go away for six or eight days. After that you will find the pulp is completely digested, and there is no soreness.

In old pyorrhea pockets where you are not certain of having washed out all the blood and mucus and *débris*, if you pack that paste down you will be sure it digests everything dead and you have a fresh new surface. In all of these cases where you leave the papain paste in a tooth two, three, or four weeks, you need fear no putrefaction in the presence of this compound, because it does not take place. It is too strong bacteriologically for any of the spores to develop or the already living organisms to thrive in the presence of it, and it will not discolor the tooth.

Dr. JOSEPH HEAD, of Philadelphia. As Dr. Harlan has so wisely said, reiteration is one of the principal methods of instruction ; otherwise I fear I should not have the audacity to appear before you, as the subject of *porcelain inlays* has been reiterated and reiterated. And yet new points are constantly coming up. I do not know exactly what portion of the subject of porcelain inlays you would most desire to have dwelt upon, and the subject in itself is so large that there is not time to cover the entire ground. Perhaps, however, it would be well to speak upon shadow variation that was especially demonstrated by the patient this afternoon. Shadow variations will be a problem to the end of time, because, no matter how well the porcelain inlay is matched, the shadow that

comes from cementing pieces of porcelain into approximal cavities will always produce changes that are difficult to foresee. In the mouth of the patient that I brought for your inspection there was an inlay in a posterior cavity upon a second bicuspid. The variation did not appear very great when inspected from the front, because I happened in that case to be fortunate enough to make a fairly good match, and yet those who are acquainted with White's shade ring noticed that the color of the tooth was 31, and the actual color of the porcelain filling was 36,—a variation of four or five shades lighter. Wherever the light penetrates the porcelain and is not returned to the eye in absolute reflection, as in approximal cavities in the front teeth, there is always a darkening in color.

The question of using platinum or gold for a matrix has been discussed almost beyond need of further remark, and yet I occasionally am asked if I used a gold matrix or if I have not been converted to the gold matrix. It is extremely difficult to say more frankly and plainly than I have that the platinum matrix in my hands still gives satisfactory results. The platinum matrix in your hands, with the proper method, will also give satisfactory results, and will, I think, give more satisfaction than the gold foil used as a matrix. A gentleman who does this work very well, but whose modesty prevents him from giving himself due credit and prominence before the profession, presented me with some platinum foil which, instead of being $\frac{1}{1000}$, was $\frac{3}{1000}$ to $\frac{4}{1000}$ of an inch in thickness. He said this foil was capable in his hands of making a better adaptation, because he used the platinum foil as the gold foil is used for making a matrix. As I have explained on many occasions, the gold foil to make a matrix is pushed or swaged into place by means of spunk, cotton, or bibulous paper. There is not the burnishing that is ordinarily required with platinum foil, and therefore if the same method is to be used with platinum as with gold, I should strongly advise the use of this thin platinum foil; but I also warn you that in using this thin platinum foil you will not get as correct an adaptation as though you used the thicker foil. Reiteration, O reiteration! But I intend to reiterate once more. To get an absolute adaptation, it is necessary to have the platinum foil soft and of a thickness not less than $\frac{1}{1000}$ of an inch. The piece of foil taken should be large enough to be held absolutely immovable. When it is placed over the cavity, the margins should be first marked out by means of bibulous paper or cotton used as a slight swaging plunger, and the metal should be pushed into the cavity as far as possible without tearing. The edges should be always smooth, and without the sign of a wrinkle; and when this is done and the foil held firmly the burnishers should be carefully circled around the edge in slowly descending sweeps until the bottom of the cavity is reached. When the bottom is reached the operator should stop and never burnish upward, because burnishing downward stretches the edges tighter against the enamel, but a reverse motion will cause the foil to rise up and impair the fit. If the work is well done, it will be done quickly; if it is done slowly, in all probability it will be defective, for the true motion is simple and short. There is only one right

way to do it, and that is to go steadily and carefully from the top of the cavity to the bottom in circular-sweeping burnishing motions.

I might speak of the low-fusing body and the high-fusing body, but I am sure you all understand the difference between them. When I was in Baltimore a gentleman who used Dr. Jenkins's body and the other low-fusing bodies got up and said that those who thought it was easier to use low-fusing body than high-fusing body made a mistake, because it was so much easier to burn out the color of the low-fusing body, and it was so much more difficult to get a contour with it that the skill required for the low-fusing body was really much greater than for the high-fusing body. When we consider that the high-fusing body is based upon the Close body, which has been used in the mouth and found to be permanent for over forty years, if the method by which the high-fusing body is used is easier and quicker than the method by which the low-fusing body is used, I can hardly see the slightest reason why there should be any advocates of the low-fusing body.

I have spoken of the points that seem to me most important, but if there are any questions, it will give me great pleasure to answer them, if I am able to do so.

A MEMBER. Last year I understood that an inlay might be a very good color in the daylight, but under the electric light be entirely "off." Has anything been done to correct that?

Dr. HEAD. I had special reference in those cases to the tips of teeth, and I am free to say now that until we get an absolutely perfect cement that will have the same light refraction as the tooth-structure the shadow variation will always be an obstacle that will interfere to a certain extent with the artistic appearance of the inlay. For instance, if one sits under the electric light so that the light shines from above on a tooth tipped with porcelain, the light is shut off by the cement from the porcelain beneath, causing a decided line of shadow; in the same way, if the light is thrown from below against the tip there will be a similar variation in color of the tooth and inlay, in this case the tip being the whiter. But since ordinarily the line of cement is perpendicular and the light comes directly at the person, if the porcelain has been well matched there will be comparatively little trouble from such variations, as, most fortunately, the eye is very slow to detect the faults of the operator.

Evening Session.

The evening session was held in the amphitheater of the Academy of Medicine; the president, Dr. W. W. Walker, occupied the chair.

The PRESIDENT. I am glad to welcome all the visiting friends of the Odontological Society, especially those from the Far West, who have come here to clinic and to read papers for us. We should all feel proud to welcome Miss Dr. Gallup, of Boston, corresponding secretary of the National Association, and also Miss Dr. Pfeiffer, of Chicago.

Dr. S. G. PERRY. Mr. President, I do not remember an occasion when the Odontological Society was so honored in its clinicians and its essayists as at this meeting, and it seems to me some special allusion should be made to that fact and a special vote of thanks

given the gentlemen who have come from so far,—and early in the evening, too, so it shall not escape the attention of the society. Think what it means for these gentlemen to come so far, and for us to receive so easily the fruits of their experience! I never remember witnessing clinics so fresh and new and interesting, but withal so practical.

Without taking your time, I wish to call attention to the very interesting bridge-work shown. I was pleased to see so beautiful a system of removable bridge-work, resting upon the gum so there would be no crevices, and so made that the patient could take it out and clean it at any time. It is the only style of bridge-work I have ever been willing to indorse.

In reference to Dr. Harlan's clinic, I think that requires special notice, because if there is any trouble a dentist encounters, it is the trouble of having to remove from the roots of dead teeth the contents of those canals, whether the pulps are recently destroyed or devitalized a long time. If Dr. Harlan has a method by which the contents can be digested and removed in that way, think for a moment, gentlemen, what it means to us!

Dr. Hinkins's clinic was one of great interest. His system has not yet been long tried, and Dr. Hinkins does not speak too confidently of it, but it gives much promise. It will be a great gain if a coating of cement can be applied for holding loose teeth together.

As to Dr. Head's clinic, we know what he has done in the past, and we saw to-day a magnificent specimen of what he can now do.

It is an unusual thing to do at the beginning of a meeting, but I want to ask you, Mr. President, to entertain a resolution of thanks to be given in the most cordial and earnest manner to the gentlemen who have come so far and who have done so much for us.

THE PRESIDENT. Drs. Harlan, Hinkins, Griswold, Head, and Brophy, I am very happy to announce that you have a unanimous vote of thanks from the New York Odontological Society for taking the pains to come here and present these subjects to us this afternoon and evening.

Dr. TRUMAN J. BROPHY then gave a lantern exhibition, demonstrating his *operation for cleft palate*.

Dr. N. W. KINGSLEY. I have never had any experience practically with surgical operations of this kind. For more than forty years I have been treating cases of congenital cleft palate, and have formed theories based upon my observations. I am inclined to think that some of those theories were based upon imperfect knowledge. I have not seen any of the cases that Dr. Brophy has described, and it is not for me to dispute the claims he has made. It would be discourteous, and I do not know that I have any reason to dispute them, excepting that they violate some of the theories that I have held. I recall reading the first description of Dr. Brophy's operation that appeared in print some years ago, and it seemed to me more brutal than he has described it here. I think that at that time I put in writing somewhere a parody on the cry of M^{me}. Roland; I said, "O Surgery! what crimes have not been

committed in thy name!" But while it is a fact that surgery has committed innumerable crimes, it is no more a reflection upon surgery than upon many other outgrowths of civilization. We can say of politics, of religion, of charity, philanthropy, benevolence, and every other form of human activity, "What crimes have not been committed in thy name!" It does not mean that surgery has not been a most beneficent profession; that it has not done wonders for the good of mankind, and is doing more and more every day. Surgery began with empiricism, and every advance step in surgery has been empirical. It has appeared to me that the jamming of the jaws together from side to side would, to a considerable extent, obliterate the nasal passages. Dr. Brophy says it does not. And as Festus said to Paul, "Thou almost persuadest me to be a Christian," so I say to Dr. Brophy, "Thou almost makest me believe that I have been nursing fallacies all the days of the past." I do not know but he is correct. That remark indicates some doubt, and the doubt is based upon the fact that I have not seen these cases. I have only seen drawings. I mean no reflection upon the drawings, but we all know you can prove by a drawing anything you want. I have been more impressed with Dr. Brophy's results by what my associate, Dr. Ottolengui, has told me. He told me when he returned from Niagara a year or two ago that he had seen one of these patients, and had made a cursory examination. He described the operation and results, and I began to think that, after all, Dr. Brophy is not an empiric; that is to say, he is not experimenting for the sake of experimenting, utterly reckless and regardless of results. I do not know, and he does not know evidently, how all these things are going to turn out. I believe that the oldest one is now a dozen years of age, and he says that the speech there is perfect. By perfect I suppose he means that it passes without any observation of defect. That is sufficiently perfect. If I heard the speech with my ears, I might notice some things which I detect in cases of my own when other people say they speak perfectly. It is remarkable how an untrained ear will hear defective speech and fail to detect inaccuracies. A girl of fourteen or thereabouts came into my hands with a wide cleft, reaching through the alveolar process; so much so that the two sides of the jaw at that point were not in union. Although they were in contact, they were not united. I could pass an instrument from under the lip through the fissure. I spoke to the mother about the imperfect speech. "Why, we don't think so," she said; "and her friends don't think so. They think she speaks remarkably well." I said, "I think she speaks very badly." The mother said, "The friends we are visiting here in New York are surprised she speaks so well." Let me explain that idea. You may ask one of these cleft-palate people who speak so imperfectly to count. You know what he is going to say,—one, two, three, four, etc. It does not make much difference how he says it, you know what is coming, and you interpret in advance his imperfect articulation of those words. Although it may be improperly enunciated, you are prepared for the answer, and you get a fairly correct idea. Such experiments do not test the speech. I will

tell you a better test. Before this same mother I subjected the daughter to this experiment: I had some persons sitting where they would not be seen, but within ten feet of the patient in the chair. I took a newspaper from my pocket, and asked the child to read, I not knowing what the article was. It was one of the editorials in the *Tribune*, and she read it fluently, but I could hardly understand what she read; and the people who were listening said there was only one paragraph they could comprehend, although she read for two or three minutes. They did not know what was coming, and therefore were testing her enunciation upon its merits only. The true test must be something of that character. I do not intimate that the child patient of Dr. Brophy's would not stand any test. I presume it would, because such things are possible. Indeed, it is possible to get fairly good speech from a cleft palate that has worn no instrument and has never been operated upon. That may seem extraordinary, but it occasionally occurs. For years I have been studying this, and am still puzzled to account for it. I do not yet know all that enters into the mechanism of speech with deformed organs. I wish I did. Every time I have a patient, although the cleft may be very much like another and I may make an instrument that has been used in a similar case and has produced marvelous results, I cannot promise what the result will be. I can only hope. So many things are incident to perfect articulation,—there is the resonance of the nasal cavity, the management of the voice, the action of the lips, etc., so I sometimes feel that the longer I live the less I know about it.

So far as the merits of the two methods of treating cleft palate are concerned, Dr. Brophy was right in something he wrote two or three years ago, when he referred to the impossibility of applying his method to any except favorable cases. I did not this evening see very much stress laid upon that point. Indeed, I was rather surprised to see the first drawing that was placed upon the screen, which was a most unfavorable case for surgery. The favorable cases for surgery which I have heretofore seen were those where the fissure did not extend very much into the palatal bone or through the maxillæ, but cases that were confined principally to the soft palate, where there was considerable tissue that could be brought together; but even in those cases, which may be called the favorable ones outside of Dr. Brophy's operation, I do not think I ever saw one where the surgical palate was long enough to close the passage to the nares. There was always a passage behind, always an escape, and distinct pronunciation was always wanting.

I will not attempt to dispute the positions taken by Dr. Brophy. I can only say I would like to see the cases. Some years ago I wrote an article for Harris's "Principles and Practice of Dental Surgery." It was written in the winter of 1871. Therein I said the failure of the surgeon to produce beneficent results by operations upon cleft palate was the "opprobrium of surgery." It had not then been done. In talking with Professor Annandale, of Edinburgh, Scotland, nearly forty years ago, he stated he was going to begin operations upon infants. He said, "Surgeons would get

better results if they began much younger, and I propose to begin on infants." I never heard whether he did, or what was the result; and I presume from time to time the same suggestion has been made by others, but it seems to have been left to Dr. Brophy to make a successful operation upon the palate in the earliest days of infancy. And also, so far as I know, credit is due to him for the peculiar operation of jamming the maxillary bones together until they come in contact and getting union. Therefore I bow to Dr. Brophy, and congratulate him on having removed what I once called the opprobrium of surgery.

Dr. W. C. BARRETT, of Buffalo. I do not know what I can add, further than to contribute something from my own personal knowledge. I have been acquainted with Dr. Brophy's operation from its inception. I have seen him perform it as many as three times in one day on as many cases of cleft palate in infants. I believe the operation to be entirely new and original with him. He has described this evening three operations. I do not think he sufficiently differentiated between them, and some may not have caught the idea that there are quite separate operations of which he has spoken, and which are performed on different classes of patients. I do not know how many favorable and unfavorable ones there are, but I believe he never has found one so unfavorable that he has refused to operate, provided there was sufficient vitality in the child to warrant the procedure.

The first operation is radically to close the hard palate. You must remember that this is performed when the child is not more than ten days old, if he can have his way. At that time the maxillary bones are not completely calcified, and it is frequently possible with the thumb and finger to press them together. These bones will yield sufficiently, and if they do not it is a comparatively simple matter to bring them together. At that age, there is very little surgical shock. The child bears the operation better than at a later age. I have known him to operate in cases of which I had personal knowledge when it was rather against his judgment, because he thought there was not sufficient vitality in the child. In one case especially he operated almost against his judgment, and rather protested against it. The mother herself desired it, however, and when he told her what would be the risks, she said, "I love my child sufficiently well even to assume the responsibility for its life, because if nothing is done and it grows up with this deformity it will practically be dead, so far as its usefulness and happiness are concerned." He took the risk, closed the palate, and almost immediately a great change was initiated; the child was able to take nourishment, and then began a growth and increase in strength and development that was marvelous. I believe at that age there is nearly always tissue enough,—no tissue being lacking. There is no deficiency of tissue, but the muscles are functionless because of lack of point of attachment, and until this is remedied they do not commence development. Later in life there is a deficiency of tissue, due to the atrophied condition or lack of growth and progression. In early life, when the two sides of the

fissure are brought together, the soft palate will reach the posterior wall of the pharynx; later it will not.

The second operation is the bringing down of the periosteum from the palatal arch, and thus gaining tissue by depressing the vault. This is adapted to that later period when the deficiency exists. Nearly the whole of the periosteum is brought down, and the roof of the vault flattened, with the result of the production of new bone from the depressed periosteum. That operation I have seen performed quite a number of times; I do not know how many. I have seen a number of children beyond the period of infancy and several adults operated upon, and, so far as I know, in every instance with success. Dr. Brophy has a record of two hundred and seventeen children operated upon for congenital cleft palate at less than six months of age, without the loss of a single case,—almost unprecedented in surgery. I am growing more and more enthusiastic about this year by year, as I see the effects of the operation. It is something that few of us will ever do. I once undertook it in connection with a better surgeon than I, and our combined efforts were only moderately successful. It is not every one who can do it well. It is not the most assiduous student who becomes a successful poet. Few have the peculiar combination of qualities which distinguishes the natural surgeon, and so there are few of us that will ever perform this operation, for it requires something more than common intelligence and professional knowledge.

I am proud to-day that I am a dentist, for dentistry, like Prometheus, has brought from heaven to earth some of its choicest gifts. Not the least of these beneficent endowments is the operation for the radical cure in infancy of cleft palate. That operation has already become a part of surgical practice, and it will stand. I think that with sufficient skill it can always be a success, and that even unfavorable cases can at least be very greatly benefited. I never have yet seen one from Dr. Brophy's hands that was so unfavorable that the cleft was not closed completely and the child restored to the possibility of speech. I once made a declaration, perhaps within the hearing of some present, which was generally misunderstood. I spoke of One who touched the eyes of the blind and they saw; and I said I believed it to be as great a miracle when the dental surgeon touches the lips of the dumb and they speak,—speak as any other person speaks,—restoring the usefulness of that which belongs to manhood and womanhood. You may call it a miracle, or what you will. I take rather a practical view of miracles, and I believe this to be a complete one, when the modern surgeon is enabled to restore sight to the blind and to give speech to the dumb. It is as great a miracle as though it were accomplished by supernatural means. Gentlemen, I repeat that I am proud that I am a dentist. I revel in the thought that dentistry has done these great things for the world. A dentist gave to man one of the most beneficent gifts ever bestowed upon the afflicted,—anesthesia. It has been presenting to the human race marvels continually from that day to this. It has been benefiting man, and constantly diminishing the difficulties and evils under which human nature labors.

It has given comfort to the afflicted and restored the maimed to their natural condition. I am glad that I belong to a branch of the great healing profession. The great Healer went about doing good, and dentistry is accomplishing that same thing in this generation; is adding these blessings day by day and year by year, developing from the lower toward the higher, until the time shall come in the not far distant future when it shall be universally considered as one of the most beneficent professions which ministers to the necessities of man.

Dr. FANEUIL D. WEISSE. I have listened to a description of the operations done by Dr. Brophy with a great deal of pleasure. I have looked forward to hearing him since I heard he was coming to New York to describe his operations upon the palate, and have been more than pleased at the clear elucidation of the several steps of his operation. I do not bring to bear, in consideration of this operation, any practical experience in operating upon cleft palate, nor do I bring to bear upon the subject anything in the direction of mechanical skill in the making of an artificial palate.

It is some years since I have been connected with the medical profession in surgical practice, and I have been a listener to the comments of a previous generation in reference to operations on cleft palate. The subject has always been of great interest to me and from time to time I heard, from views expressed,—in 1868 in London and Edinburgh and Dublin, and from views expressed in this country by those high in surgical history for the past thirty years, as has been stated by Dr. Kingsley this evening,—that the surgical operation for cleft palate had not been a success, and the surgeons hailed the appearance of the artificial palate as a means for remedying the deformity. Of course attempts have constantly been made for the relief of this condition by surgical operation, and one measure has been advanced after another to overcome the great difficulty that obtains after the sutures are placed in the palate,—vivifying the edges and approximating the sutures,—the great difficulty being that the sutures tear out. I have seen cases where these operations have been attempted and been partially successful, and where I have directed, in cases that have come to the infirmary of the college with the condition of partial union, that this partial point of union be severed and the patient placed in a condition of cleft palate that would allow of an artificial palate. I have heard many men say that the introduction of the artificial palate was a boon to mankind.

Under these conditions, I would state that the efforts that have been made by surgeons to make the operations successful have been to relieve all the tension on the suture. That was the great trouble. They resorted to making different sections in the palate, leaving gaps in the sides of the vault to cicatrize as best they might; but they were all unsuccessful. Therefore, it is delightful to hear of the success of Dr. Brophy's operation. Looking at it from a surgical standpoint, it did seem to be a very radical measure. It seemed to be a measure in which the after condition of the mouth would be most unfavorable. I felt that. I said constantly I would

like to see those mouths two, three, six, or eight years afterward. I do not ask to see them now, from the demonstration that has been made to-night; and one of its most striking features is the picture showing the squares placed upon the arches, upper and lower, demonstrating the fact that the difference between the square as placed upon the lower arch as compared with the square placed upon the upper was just the difference in the gap that existed. That seems to be the solution of the whole question. That gap was the difficulty. It was a natural gap under the circumstances, and the operation restores it to the condition it should have been in were that gap omitted.

Dr. Barrett has said that at that time all the tissues are there for proper union. Yes; the squares demonstrate that. The difficulty is the gap; the closing of the gap restores it to the natural position, and the physiological playing of the muscles upon those parts would cause that upper jaw to develop properly. The illustration where was presented the casts in occlusion, showing the faulty condition, the arch entirely outside of the other arch, indicates the condition of the increased gap. The statement was more anatomical than physiological that if it be not done at this time the want of play will prevent the proper physiological development of those parts, and an operation later will find deficiency of tissue in later life, because they have not developed up to the conditions of the age at which the operation is performed.

All the evidence of surgery is in favor of these early operations. I have seen long statistics by authors where they have done hundreds of cases of operations for hare-lip during the first year compared with operations during subsequent years,—not to speak of operations of cleft palate; but Dr. Brophy has certainly caught it, whether intentionally or not, at the right time. He has demonstrated that to me by the illustration of the squares he presented.

Another point in these cases is that not only three operations were described there, but also an operation for the premaxillary bones. I know from observing and seeing operations in past years what difficulties surgeons had with these premaxillary bones; they were a great obstruction. I have heard Valentine Mott discuss the question of what shall be done with these premaxillary bones. He always said, "Do not cut them away." I remember where they were cut away in one case, and the surgeon had a hemorrhage which kept him up all night to stop. Dr. Brophy's operation in cutting away a triangular piece of the inferior angle of the vomer is certainly a happy thought well carried out.

Again, with reference to the approximation of the two halves of the upper jaw. In approximating the two halves it would be said you diminish the nasal cavity. If you look at Dr. Brophy's results, you will see you do not obstruct it. You will notice the darkened line; that is where he puts in an instrument. He produces a fracture there, just above the floor of the nasal cavity. And what if he does? A fracture unites easily, and there is no part of the body where a fracture will heal more readily. There is no portion of the body where you have repair so rapid as in the upper jaw. It is operating in a region in which it is perfectly safe to operate.

Another point that strikes me as a triumph in surgery is with reference to the operation he suggests to be done later in life, although it does not appeal so keenly to me as the operation for closure of the palate in early life. I was pleased to hear him state that in many cases he finds the cleft on the left side in ninety per cent. of the cases. He finds the vomer coming down and attached to the inferior border of the maxillary bone, and running along there. I doubt if many in this room have had the opportunity of seeing many cases like this, but in the practice of general medicine I have seen very many that are most deplorable; and most deplorable of all are they to the parents who see their children come into the world in the way these do. Dr. Brophy is to be congratulated for having found a means of remedying this defect, and I congratulate him heartily on behalf of the medical profession, as well as the dental profession, for the success of this operation and the restoration he affords from a deformity with which many have gone through life, but which no one in the future need bear through life, owing to the success of Dr. Brophy's operative procedures in these cases.

Dr. L. D. SHEPARD, of Boston. I do not feel myself competent to discuss this question, but I wish to add my testimony of admiration and appreciation of the work done by Dr. Brophy. I have been familiar with it for the last few years, but I have been more familiar for thirty years with the condition of the surgical men in regard to the operation as it was understood and practiced by them previous to the invention of Dr. Brophy. It was my province thirty years ago, in conjunction with the late Henry J. Bigelow and the present eminent Dr. Beach, of Boston, to be the instrument of an attempt to make an improvement in the operation as performed by the senior Dr. Warren (father of the present Dr. Warren).

On pages 1 and 2 of Vol. III, No. 1, of the *Boston Medical and Surgical Journal*, February 4, 1896, will be found the report of a clinical lecture on cleft palate delivered at the Massachusetts Medical College, Harvard University, December 21, 1868, by Henry J. Bigelow, M.D., professor of surgery. In it Dr. Bigelow says: "In showing a plaster cast of a cleft palate recently operated upon, I would direct attention to a mechanical expedient for aiding union of the palate in the operation of staphylorrhaphy, first employed, so far as I know, in this case. . . . The expedient to facilitate union before alluded to consists in the employment of a temporary artificial palate—in this instance of hard rubber—to protect the parts during cicatrization. Its use was suggested to me by Dr. Beach as a means of shielding the tongue from metallic sutures, and thereby enabling the surgeon to employ them conveniently during this operation. It also occurred to me that this arrangement would protect the palate from the peristaltic action of the tongue in swallowing, and other involuntary movements which endanger union.

"It is pretty well established that the success of the modern operation for vesico-vaginal fistula mainly depends upon the use of the metallic sutures planted close together, so as to insure close

contact of the wound, with an irritation so inconsiderable that they can be left in place from one to two weeks. Similar advantage ought to accrue from their use in the palate. The hard-rubber palate here shown was made by Dr. Shepard, adjunct professor in the dental school of this university, and fitted so as to cover the whole region occupied by the palate after the operation. It conforms with the arch of the normal palate, leaving an interval of about a quarter of an inch between it and the mucous membrane. Behind, it bends down just far enough not to incommode the tongue, while in front it was in this case keyed in the interstice of the incisors left by the former hare-lip, and laterally attached by a string to a tooth on each side. The whole is made as accurately as if it were a plate for false teeth. A hole near the front admits the nose of a small syringe, by which the interval between the plate and palate was syringed with warm water twice daily. In this case I cannot doubt that this contrivance was of service. The fissure was wide, reaching forward to the incisors. The flaps were detached well forward from the bone, and seven fine silver stitches were inserted. The plate was not removed for the examination of the parts until the eighth day, when every stitch was found in place and was removed, the union being perfect. I cannot but think that, whatever be the operation upon the palate, a more perfect union will be secured by silver sutures thus protected than by the ordinary method."

Dr. Beach was then a young surgeon, and was my friend. At his request I devised and made the vulcanite plates for about twenty patients during the year 1868. I attended all the operations by Dr. Bigelow, and upon the completion of each I inserted the plate and made it secure. The cases presented many varieties of fissures, and the methods for securing the plates differed according to circumstances. To meet the difficulty of finding attachments in one of these cases, a boy of eight years of age, with decayed temporary molars and partly erupted permanent first molars and incisors, I made bands of gold, and cemented them to the short teeth with oxychlorid of zinc to hold my retaining strings from slipping off. This was, in my opinion, the first time bands were cemented to teeth. The first publication of the method was by Dr. Farrar, in the DENTAL COSMOS, June, 1879, page 306, in these words: "Dr. L. D. Shepard suggests a useful plan of securing rings by the use of oxychlorid of zinc."

As a result of this series of operations, the surgeons of Boston, at the head of whom was Dr. Bigelow, became convinced that any further attempt at a surgical repair of the fissures was unwise, and for many years afterward no attempt, I think, was made to repeat any of those surgical operations. The operation has been renewed within the last half-dozen years by others.

Having thus had experience with one of the most marvelous and accomplished surgical geniuses that the century has produced, Henry J. Bigelow, of Boston, and his acknowledgment, after taking it up again on the suggestion of Dr. Beach to try again to make it a success, that the operation was a failure as then practiced, I am

in a position better than most of you to give to our friend from Chicago my earnest reverence as a man who has made a great advance for the amelioration of suffering humanity. I testified to the present Dr. Warren, of Boston, my appreciation of this by bringing him into communication with Dr. Brophy, so Dr. Brophy's work should be recorded in the great work on surgery which Dr. Warren, with other collaborators, has recently published to the world. It was unfortunate that it came a little late, but the relationship and acquaintance between this author and Dr. Brophy, I am happy to say, will result in further notice of it in subsequent issues. I am happy to be here to-night to thus tender to our friend my homage and admiration.

DR. A. W. HARLAN. As I sat here this evening and looked at the pictures on the screen, and listened to my friend Dr. Kingsley and the other speakers, it seemed to me that I was repaid for the time I spent a few years ago in looking up the subject of the surgical and mechanical treatment of cleft palate. Perhaps you would not be so seriously impressed with this fact that I am going to state to you, but once upon a time I had desires to become an oral surgeon. There were circumstances, however, that led me into other channels. I even went so far as to perform operations on animals for the closure of clefts that I had made myself; and I also performed operations on living human individuals who had clefts of the palate, but I abandoned that work. From the day that Gedenke constructed the first silver palate to improve speech until the present time I can tell you something of what has been done. That was before the day of Ambroise Paré, who was perhaps one of the first who attempted to make a closure of the cleft in adults, and a hundred years or more later a member of our profession, Roux, performed an operation for closure which, in the adult, was successful. That went along through the hands of the various surgeons in Italy, Austria, Germany, and France, until almost every one had attempted it,—Voltini, Otto, Dieffenbach, and others, including Copper, Hunter, Fergusson, and others in England, and O'Meara, a brilliant Irishman, who performed that operation in Dublin about 1760,—until 1800, when nearly every surgeon of prominence had performed this operation on adults or children who had attained the age of twelve or fourteen years. None of these operations were able to perfectly correct defects of speech, and so it remained for Stearns, who went to work and made an obturator for himself, I believe. And after Stearns, the man who made speech possible was the man who sits before me to-night, Norman W. Kingsley. He was the man who made the first obturator that was successful, so that articulate sound could be heard in all its variations and shades, and so the hearer could understand that that person knew how to speak every word and every letter in the whole alphabet, whether it was English, French, German, or any other language.

They were not satisfied with that, however, and so it remained for Brophy to devise an operation at an early age—so early that no one had ever thought of it before—to close this cleft. That is simply

one of the phases of evolution. Everything goes along step by step. This is the accumulated tripod that started with the little beginning of Gedenke, who wanted to close the cleft of that ignorant German so he could speak, in the fourteenth century. Before that, as far as we know, it had never been done, and no one ever seemed to think that this thing must be done at an age when, through lack of use, the parts had not attained their development. I do not stand here as a surgeon or a pathologist, but I yield to no man in this room a knowledge of what has been done in the past in these things, because I have spent hours and days and weeks and months and years thinking about them, thinking perhaps some time or other they might be useful to me. Measurements have been made of the growths of the jaws of children from the time they were born until the eighteenth year, to show what takes place. Brophy himself is not able to tell the reason why the sinuses develop just as they ought to after these operations were made, and why the crypts that contain the germs of the permanent teeth hold them so that when they are erupted they come out properly and regularly, and with the occlusion perfect.

My friend, Professor Grevers, who is connected with the Dutch University, showed me, from charts and measurements taken from hundreds of jaws of children, why it is that Brophy succeeded in the operation which came to him through the failure of so many eminent men who were so brilliant,—Mott and everybody else who was mentioned,—brilliant in everything else, but it never occurred to them that this must be done at an age which was just the proper age for the development of all the tissues that surrounded these clefts. Grevers says if the child is operated on at the sixth week, that the maxillary sinuses and crypts containing the teeth will develop in a regular, normal manner, and phonation and resonance and everything else will be perfect. Dr. Brophy had no knowledge I was going to speak on this subject, and I had no intention of doing it myself. This is one of the operations that is of the greatest benefit to humanity. Dr. Kingsley did a great thing when he constructed an obturator, and its usefulness has not passed by any means, because we do not have in every city and every town and every hamlet throughout the civilized world men who can make operations at the tenth or twentieth day after the child is born, and consequently we will have these palatal defects, and they must be filled with obturators so that speech can be made possible.

It gives me great pleasure to tell this audience to-night that these measurements of Grevers explain something that Dr. Brophy himself could not explain; and why he settled upon as early a time as the tenth day after birth to make it absolutely and positively successful is one of those divinations which no one can account for.

Dr. R. OTTOLENGUI. I would not rise at this late hour, but Dr. Brophy asks me to do so, and I accede to that request because I wish to do two things. I wish to agree with Dr. Brophy and to disagree with him, something which no one to-night has had the temerity to do. I will take the pleasant part first, and leave the other until afterward.

Before I had the pleasure of meeting Dr. Brophy I was a skeptic. Every time I have met him, however, he has been exceedingly courteous to me. He has given public demonstrations at those times, and then has taken me up to his room and given me private demonstrations, so I am more familiar with his operations than those who have only seen to-night's demonstrations. I have seen the instruments and studied the pictures. Whereas before I met the doctor I was a skeptic, practically now I am a disciple. Nothing would give me greater happiness than to be able to perform the operations Dr. Brophy does, because if I had that skill in technique, coupled with what I have learned from Dr. Kingsley, I feel I would be an exceptional man to take care of cleft-palate cases.

I wish to speak of a feature that is exceedingly interesting,—interesting because the result would not have come from any but a dentist, a man well acquainted with the treatment of these cases. The inexperienced dentist who undertakes, perhaps for the first time, to make an obturator for a mouth where the fissure extends through the hard palate, will invariably make the plate which covers the hard part of the mouth so that it follows the high vault. Never mind what is done in the back of that throat in the way of an obturator attachment to that plate, perfect speech with such an instrument would be impossible. I believe I would be correct in stating that Dr. Kingsley conceived the idea and originated the practice which he follows, of lowering the vault in these cases. That is to say, the plate which spans the roof does not follow up to the top of the fissure, but stretches across, making the vault such as it would have been had it been normal. In making the surgical operation on the adult, that is just what Dr. Brophy does, as he explained with his fingers, about bringing the vault down. Leaving the vault high, the tongue cannot reach it, and many sounds are impossible. But Dr. Kingsley with his plate and Dr. Brophy with his operation bring the vault down and make perfect speech possible.

I approach the second part of my discussion with more embarrassment, because Dr. Brophy has selected that as the best portion of his paper, and especially since Professor Weisse has eulogized that also as the best part of the paper. I have become such an admirer of Dr. Brophy and his operation that I regret that he should have introduced those two pictures with the squares. It seems to me that since Dr. Kingsley made his prophecy that these cases would result in poor occlusion, the idea has rankled in Dr. Brophy's mind, and he has felt it necessary to find an explanation for his good results. But it seems to me it would have been only necessary for him to say, "Kingsley, your prophecy is based on theory; my result is based on experience," and he could then show patients.

I think the explanation which Dr. Cryer gave is very much better than the one given to-night. The point I wish to make is this: Dr. Brophy has shown some models, and he makes the claim that the upper jaw in infant life is larger than the lower jaw, and that it is wider just by so much as the width of the fissure. I have not the slightest doubt that in the case shown it was so, but I do doubt that in all cases it is so. He follows it up by showing a case in

adult life, when the permanent teeth are all in position, and claims that were it not for the closure of the fissure you would have the upper jaw occluding naturally outside of the lower. If that argument is to be a scientific one, and to be of weight, then that condition should follow in every case; but it does not. It has not been my experience, and I doubt if it has been Dr. Kingsley's, judging from his models, ever to have seen such a case. Hundreds of fissures through the entire jaw have passed through our hands in which the occlusion is not of that character; consequently that argument is based on an isolated case, or two or three which are not normal, and should not form the basis of argument. I have not a large acquaintance with infants just born, but I would suggest to the gentlemen present the next time they see an infant to examine the jaws, and I think they will find the lower jaw narrower than the upper. It seems to be proper and physiological that it should be so. In the adult, the upper jaw sets over the lower, and is fuller, and it seems to me probable that the edentulous jaw should be so. It is an odd circumstance that the width of the fissure should equal just that difference, but the main point is that the argument does not hold through the second set. I think Dr. Brophy said in his paper that except for the closure of the fissure, your adult jaw must be abnormally wider than the lower; and that has not been our clinical experience, not even in a single case.

Dr. BROPHY. It would be a very poor discussion indeed if someone did not take issue with the writer of the paper or the one presenting it. I listened with a great deal of interest to the statements made by Dr. Ottolengui, and I am a little surprised, because I have not yet seen a case in a young child where there was insufficient tissue, or at least where there was not enough tissue, to make it possible to bring the parts into apposition and secure them there firmly and get union. I have not yet seen a child upon whom such an operation was being made who had defective speech when he had attained an age when you naturally expect him to speak. It seems to me so clear that whenever we have these bones divided they are sure to spring apart as the lower jaw extends upward and forces itself against these walls that there is scarcely any room for argument. The slightest pressure upon the bone in moving or approximating them will show that they spring. What can you expect when the lower jaw comes in contact with the arch and crowds the upper maxillary bones farther and farther apart? That is why the earlier operation is better than one at a later time, because as the child grows older the arch is so widely spread that the tissues will not meet in some cases. I have seen many patients in adult life whose upper jaws were spread by the pressure exerted by the lower jaws, and that has been the experience of everybody. You will find that the lower jaws in adult life have expanded beyond the normal in many instances, and by reason of that provision of nature I can readily see why Dr. Ottolengui argues as he does. The squares placed upon those drawings show in a manner that will satisfy almost anybody that that is absolutely correct in almost all cases. In almost every case you can imagine some defect or lack

of development so that no tissue would be there at all, but I have had many of the conditions illustrated by those plates. There is nearly always tissue enough in early infancy to produce a good palate. There never was a rule yet that had no exception; there are exceptions to this. There are many little things in detail and the technique of this surgical procedure I might have stated that I did not for want of time. I want to see Dr. Ottolengui in Chicago and show him many cases.

In all sincerity, I want to thank Dr. Harlan for his exposition of the early history of these defects, which I could not have gone into even if I had known all about them, and I have learned a great deal about the work of Dr. Grevers, of Amsterdam, Holland, and his careful investigations in regard to the development of the embryo jaw, as well as the jaw after birth.

I was immensely pleased with what Dr. Kingsley said in regard to the causes of defective speech. I feel exactly as he does. I am not able to tell why people speak as they do sometimes, even though all the organs seem to be present. I have a patient whom you would declare had a cleft palate if you heard him speak, and yet, so far as I am able to discover by careful observation and inspection, I did not find the slightest defect in his vocal organs, his palate, or anything that enters into the formation of speech.

Professor Le Dentu, of France, has endeavored to show that defective speech is not due to defective palate or a short palate. He claims many palates are not long enough to close the posterior pharyngeal opening, and yet those people speak distinctly. Dr. Kingsley has said some people who have extensive cleft palates speak well, and he cannot account for it. We have a problem before us that is not at all easy to explain.

As to the first picture projected on the screen, I want to say one word in regard to the remarks made by Dr. Kingsley about it, as to that case being a simple one for surgical methods. I regard that as an extremely simple operation,—one that is more easily managed than any other. In the technique of this procedure we do not remove any of the muscular parts, but simply open it and get fresh open surfaces that will meet; but the difficulty is in getting union. It is an easy thing to get the parts in contact and hold them there, but we have a mass of fibrous tissue here covering the hard palate that will not always promptly unite, as is the case with muscular tissue. In those broad cases I would frequently recommend artificial vela rather than recommend an operation. We lift the periosteum from the bone, and we get, consequently, a new hard palate. All this space fills in with new bone, and we have a new hard palate. I do not know how thick they are; I never made an autopsy, although I may some time; but the space fills, and everything goes well.

In Dr. Shepard's remarks, he spoke of the use of a plate to prevent the passing of the tongue against the sutures and interference with union. By means of the lead plate and the silver wire sutures, the twisted ends of which are toward the tongue, the patient has no desire to put the tongue against them. It does not injure the

tongue, but the silver coil wire is rather unpleasant to the tongue, so the patients let it alone and they get well. If you desired, you could even leave the sharp edges on to interfere with the tongue.

I have nothing more to say, except to express to you my appreciation of the honor of the invitation to meet with the Odontological Society, whose sessions I have enjoyed, and to thank the members of the society and their invited guests for the very courteous attention bestowed upon me and their generous and complimentary remarks upon the matters I have presented to you this evening.

The PRESIDENT. I wish to remind Dr. Brophy that the honor is with the Odontological Society in having him here.

Adjournment.

W. J. TURNER, M.D., D.D.S.,
Editor New York Odontological Society.

"IN MEMORIAM"—DR. H. J. MCKELLOPS.

ADDRESSES AT THE MEMORIAL MEETING HELD BY THE NEW YORK
ODONTOLOGICAL SOCIETY.

THE McKellops memorial meeting called by the New York Odontological Society was held on Wednesday evening, June 12, 1901, at the New York Academy of Medicine, No. 17 West Forty-third street, New York city.

The president, Dr. W. W. Walker, occupied the chair.

The following societies had been invited to participate in the meeting, and their presidents occupied seats on the platform: First District Dental Society, Second District Dental Society, Central Dental Association of Northern New Jersey, Dental Association of Central New Jersey, New Jersey State Dental Society, and Psi-Omega Dental Fraternity.

The program as arranged provided for music suitable for the occasion, rendered by prominent artists, and addresses by Drs. Darby, Northrop, Meeker, Kirk, Perry, and Holly Smith,—all old friends of Dr. McKellops, and who had been actively associated with him in dental society work. Their addresses follow.

Dr. E. T. DARBY. It is eminently fitting that we meet to-night to recount the virtues of our departed friend. In this busy world of ours, where the activities of life are so intense, we often feel that we have not the time to loiter for a moment even to hang a garland on the tombstone of a fellow-comrade. This ought not to be so, and in the present instance we should be unjust to the memory of him whom we have met to honor did we not take more than passing notice of his death. Dr. McKellops was one whom we honored as a dentist and loved as a man. I question if the dental profession ever produced one who was more loyal to its best interests than he. Without the advantages of a collegiate education, and without the facilities for thorough preliminary technical training, he by dint of perseverance, industry, and innate skill made for himself a place in the profession which few men attain. I have

seldom if ever met a man who more intensely loved his profession and who was more willing to make sacrifices for it than Dr. McKellops.

I cannot remember when I first became acquainted with him. It is so long ago that I feel that I had always known him. During all those years he was never absent from a meeting of the American or the National Dental Association. I recall one occasion when he left a bed of serious illness and traveled all the way from St. Louis to Niagara Falls, accompanied by an attendant to nurse and care for him lest he die and fall by the way. His friends were shocked by his physical condition, and it was quite generally believed that he would never attend another meeting of the association, and in token of their esteem for him he was that year unanimously elected president for the ensuing year, although many thought he would never live to occupy the chair. He was so affected by this mark of kindness that he shed tears of gratitude, which none who were present will ever forget.

As an evidence of his devotion to his professional friends, one example stands out with vivid distinctness. It was upon the occasion of the death and burial of Marshall H. Webb. Dr. McKellops admired Dr. Webb because of his great skill as an operator, and when he learned by telegraph that he had died, he at once left his home in St. Louis and traveled more than a thousand miles that he might once more look upon the face of his friend, even though that face was cold in death. Such devotion to the memory of a fallen brother is as beautiful as it is rare.

If I were to speak of the most prominent characteristic in Dr. McKellops's professional life, it would be the pride which he took in his operations. I have seen many performed by him, but I do not remember that I ever saw a poor one. He possessed peculiar skill as an operator, and anything short of excellence was distasteful to him. With a record of nearly or quite fifty years of service, I question whether any man in the profession performed a greater number of good operations than he. In the selection of filling-materials he had but two or three, and with him gold was the one most used. His creed was, "Gold is the best, and any tooth that can be filled at all can be filled with gold," and there were few instances in which he used other materials.

Of his private life I cannot speak, because I know but little. It is possible that there were irregularities which would shock the sensibilities of some, but it is always kind to cover these with the mantle of charity and remember that He who spake as never man spake commanded us to judge not that we be not judged. When the great roll-call of the ages is sounded, and we are brought face to face with our departed friends, I hope to find in that great company which no man can number my dear old friend Mac, rejuvenated and transformed, with a great big diadem on his brow and those bright eyes sparkling with celestial brightness.

Dr. A. L. NORTHROP. Mr. President and Gentlemen: We have gathered together this evening to sympathize with one another.

One of our standard-bearers has fallen,—one who has stood by our colors for nearly or more than fifty years. My recollection of Dr. McKellops runs back to 1859 or 1860, and at that time, in his operations in dentistry, he was spoken of with as much respect, with as much admiration as he was at the end, when he was called away from us. Methinks we have met with a great loss. I yet have to hear, since I first knew Dr. McKellops, any one to say aught against him as a professional man. Zealous from the first, the fire burned until the last. You never called upon him to meet with you but he was there. He was always first and foremost at our meetings, and a few years ago, when he came to New York to act upon the Clinic Committee, you would suppose he was one of our own men, with all the fire and zeal of youth. When such men as Dr. McKellops are taken from us we can truly get together and mourn. We are to look for some one to fill his place. Who shall it be?

And as we look back upon Dr. McKellops's career, our minds will not stop there. When he first commenced, he had but few *confrères*. There was Dr. Spaulding, who was a fine operator; Dr. Peebles, Dr. Clark. Gentlemen, do you realize that these men who laid the foundation for our noble profession,—the one we love, the one we live for, the one we work for,—that so many are gradually dropping away? Are we filling their places? Marshall Webb died in his youth. Not a year passes without our losing some of our best men. We hardly realize it, and when I heard the idea first proclaimed that there was to be a memorial meeting for our friend Dr. H. J. McKellops I thought it was thoroughly fitting that we should have one, and I think we ought to have one whenever occasion calls. We ought not to allow a great many of our profession to be called away without stopping and thinking of their virtues. Think of what they have done for us! Where would we have been if it were not for those men? You may say others would have filled their places. They did not. Dr. McKellops set his banner high, and on it was "Excelsior." From the first operation he made he strove to do the best he could, and he said to me in my office one time, "The very best service I can perform for my patient is poor enough."

I would like to read a little extract from a personal letter I received to-day from an old friend of ours who would have liked to be here,—Dr. C. A. Marvin, of Philadelphia. He says, "I am in receipt of a notice of the death of our old friend Dr. McKellops, and of the memorial meeting your society proposes to hold on Wednesday evening. I wish I could be there and share in the commemoration services, but it is impossible; but I join with you in doing honor to that which was noble and true in our deceased friend and commending his skillful services, his lively zeal, his worthy ambition to all. Soon will all the members of the old guard be among the 'have beens' and all the old pleasant meetings and congenial intercourse be things of the past,—pleasant memories only. My warm regards to you, gentlemen of the committee. Time only strengthens the ties which were always dear. God bless you, and every one of you!"

Dr. CHAS. A. MEEKER. As one of the members representing the state of New Jersey, it is with a feeling of sadness in the loss of Dr. McKellops that I am privileged to come before this body, representing as it does the thought and progression of the dental fraternity in the eastern and middle states, and help pay a fitting tribute to a career nobly crowned from beginning to end.

In our own state many of the men who were intimate for years with Dr. McKellops have filled their niche, performed their life-work, and passed on to that sphere where dental operations are not performed physically. Our younger and the rushing generation have come on the field of action, and only know Dr. McKellops from the reputation he has left behind him during a half-century's continuous practice and the unselfish work in one man's span of life. For the entire profession throughout the world where dentistry is known, and my own little state of New Jersey, with its present membership, it gives me pleasure to speak of Dr. McKellops's work and the sadness of his demise.

My first knowledge of Dr. McKellops came through the American Dental Association at Niagara Falls in 1878, and my first feelings of friendship at the meeting held at Saratoga Springs in 1884, when to me, a young man just launched in the dental firmament, he stood out boldly with a strong individuality as the personification of a man who stood honestly for the grand truth that in dental societies lay the future welfare and enhancement of the profession, scientifically, morally, and ethically. There was nothing of the sham about him; he spoke his mind fearlessly, honestly, and a spade was a spade; and if in his zeal there were mistakes, it was so acknowledged, and his friends knew it was for the welfare of the dental fraternity.

Any dentist from that period on need but look in the annals of dental literature and society proceedings—national, state, or local—to see the name of H. J. McKellops doing good work for his chosen profession. I never thought, nor do I think, that the dental fraternity looked on Dr. McKellops as what some of our journals designate a dental politician, the bane of many of our societies. He was too outspoken and frank, and he condemned, when necessary, without stint, and praised accordingly. He could not be the chosen one of a clique,—his very honesty and work for the societies drew toward him hosts of friends.

To those who had the pleasure of seeing his scrap-book of the advertisements of the ethical and inethical dentists, and his unique method of using it in directing a man to the dignity of his profession without causing harsh feelings, was a treat in itself.

In this connection permit me to digress for a moment. In our own state we number approximately about five hundred practicing dentists; in our state society we number one hundred and fifteen, barely one-fourth. And in the entire country the percentage of membership in societies to the maximum number practicing is even lower, and the colleges are graduating yearly between four thousand and forty-five hundred. We—that is, New Jersey—are persistently at work to raise our membership, and I often hear the

remark from the old non-members and the recent graduates when urged to connect themselves with our society, "What is the use? You give your time and money, lose the chance of obtaining patients who go elsewhere, and lose the chance of wealth or becoming financially prosperous. I am in the profession for the money in it; the societies are run by rings for the benefit of a few. I will have none of it, but attend to my own business."

Now look around this beautiful hall, dedicated to science by a follower and worker in societies originally. You see men who come from distant cities, who spend their time and money and the chance of losing some pecuniary profit,—workers in societies themselves, their names known throughout the dental world. Why do they come here? Simply to pay tribute to a man who gave his time and money and best thoughts to the profession of which he was an ornament and a member, and for what he has done to elevate that profession. His name will not go down to dental oblivion. No more will those of Atkinson and Dwinelle, who died poor; nor of Hayhurst, nor of Fred Levy in my own state. Show me the name of a dentist who died rich, a non-society member (except Evans, of Paris), and I will venture to say his name is forgotten.

You see the pictures that line this wall. They were workers for their profession; they worked for the science of medicine and its allied branches. Society workers they were, and their work raised the status of their profession to a higher dignity, and those that come after reap the benefit of their labors. They will not be forgotten.

Were it not for the men in our profession who labor unselfishly for the societies, our status would be like an ordinary trade,—low indeed, and the fake dental parlors would more than outnumber the ethical members of our profession. Therefore, I say to the members here, Remember the aged men whose names you see in society work year after year, and whose time on this side is short,—the debt you owe to them in building up your profession,—as those to come reap its benefits in a higher social status.

Dr. McKellops made the boast that he had yet to put in a tooth an amalgam filling. Leaving out the question that amalgam is a tooth-conservator, the mere fact, with the public, that he used nothing but gold, or that gold only was good enough to restore a tooth, made him patients and raised his professional status among an educated class willing to pay for the best, and indirectly increased the respect paid to the men practicing in his community.

Who can deny that the society workers in this city, Atkinson, Dwinelle, and Abbott, raised the social and pecuniary status in their profession by their believing themselves the elect of the people, and that their professional charges should be commensurate with the dignity of their profession. After Atkinson's charge of twelve hundred dollars to Banker Turner for filling two teeth, the general public awoke to the fact that dentistry was on a higher basis than a mere trade.

So, in St. Louis, Dr. McKellops performed for his profession a

great good, and the man lived with his good qualities as a dentist for his clients, and a society worker for the good and elevation of his profession. His memory will be held sweet and green by those who knew him on this side and those who come in after years. *Requiescat in pace.*

Dr. EDWARD C. KIRK. I came this evening not with the expectation of having anything to say, but merely by my presence to do honor to the memory of the man whom we all revered, and to express my sympathy with others in the purpose of this meeting. My acquaintanceship with Dr. McKellops was really a brief one, yet not so brief but that he made a most profound impression upon me. How could it be otherwise,—a man of such distinct, pronounced personality? He struck me forcibly as being a man of high ideals,—as the artist in his profession rather than the artisan; for if the definition made by some one, that the artist is one who strives to perfect his work and the artisan one who strives to get through his work, is correct, then certainly Dr. McKellops was the artist. He impressed me as a man having faith in his high ideals. What he believed he believed thoroughly, which made him uncompromising in his maintenance of what he believed was right. His loyalty to his standards made him the foe of empiricism, of shams, and of quackery. He was a man of strong emotions, as I measured him, a man fond of his friends, fond of humanity. He was a rare man, a power in dentistry, a power whose influence has been for the best in dentistry; that we all know. I do not believe that the work which he has begun—the principles which he has advocated, the ideals he has set up—will cease. I do not think any of those things, based as they were in truth, will die because Dr. McKellops is dead. I believe that is why he lived. I believe that is why such men come into the world,—to create these standards that we may carry them on. It seems to me, in our desire, our endeavor, to honor the memory of Dr. McKellops, the greatest tribute we could pay to his memory would be to earnestly and honestly strive to carry out the work which he has so beautifully set before us.

Dr. S. G. PERRY. Mr. President, ladies, and friends of dear Dr. McKellops: I want to pay a tribute to-night to the serious side of Dr. McKellops's character. Before attempting to do so, just a word in reminiscence and a word in explanation of the reason why I want to speak of him seriously. Very soon after my graduation, and at the beginning of my professional career, it happened to me to fill with gold a number of teeth for the daughter of a surgeon in the army. That surgeon was stationed later at St. Louis, and the fillings came under Dr. McKellops's observation. The first time I met him after that, which I think was at one of the annual meetings of the old American Dental Association, he was more than cordial. I could not understand why he was so friendly, and why he should speak so highly of those fillings. That was the beginning of our friendship. I could never tell just why it was that from that time

Dr. McKellops, when I met him at the annual meetings, was so ready to discuss seriously all questions of dental practice. When we were alone, our conversation ran upon serious professional subjects. If we went upstairs to his room for a toddy, or to see an instrument in his trunk, or to see some of his neckties, or talk with him about this or that, and no one was present, we almost immediately fell to discussing some serious question in dental practice.

I can remember 'way back in the early days raising with him the question of amalgam. I took the ground that our duty to our patient was paramount, and if occasion required we must use amalgam; that many teeth could not be saved so well with any other material; that we must lay aside our pride and, forgetting the artistic side of our work, use that which would give the best practical result. Dr. McKellops never once assented to that view. He always took the ground that the interests of any man's patients could never be so great as the interests of the profession. He said to use amalgam at all would be to justify its use, and if men had any regard for the higher standing of their profession they must live up to their belief, and must do the kind of work they advocated. From the beginning that was his argument, and year after year our conversations, when we were alone, drifted into such directions; so that from the very first I came to have a peculiar insight, I thought, into that serious side of his nature, and came to have a very profound respect for those rugged qualities which I saw in him.

It was not very long before I received from him a very flattering present which I take great pride in showing you,—a gold-mounted mouth-glass, with my name inscribed on the frame of the glass and on the little box, as coming from him. It was given to me with a statement something like this,—I cannot of course repeat exactly: "Now, old fellow, if you use amalgam, which you ought not to do, I will catch you at it, because that mouth-glass will become discolored by the mercury; and if you say you did not use it, I will know you did if I see the stain on the mouth-glass." That glass has been used daily from that day to this, and I ask the president to say whether he sees any mercury stain on it.

THE PRESIDENT. No, sir; not on this one.

Dr. PERRY. Then I have remembered Mac enough to see that that mouth-glass was not used near any amalgam filling, so that he gained his point that far at least. It was the best tribute I could pay to his peculiar views.

Mac was superstitious. During all the years I knew him he gave me a number of knives, and for each one I had to give him a penny. He used to say, "Well, old man, have you a penny about you?" And I came to know what that meant. This one which I show you is the last one he gave me. It is rather suggestive, having a hook for breaking the wire and a corkscrew for taking the cork out of a bottle. I always take it with me on my fishing trips. Looking through a little hole in the handle you can see the picture of his friend Anheuser-Busch. It was made, I believe, for advertisement, but I think it was prized by him, for he said, "Don't fail to look at the face of the nice fellow inside." These little presents

mean a great deal to me. I also have a toddy spoon which he brought me from Europe, and which he used at my house a great many times for mixing toddies. We all knew him as a jolly, bantering, story-telling, toddy-drinking friend, and the impression of a great many men might be that he was not as serious as he really was. I do not know that I can make you understand how I always had reverence for the serious side of his character. His aim was not outreached by any man perhaps who worked in the dental profession, and it is to that earnest side that I want to pay my tribute.

I have long thought that it is not possible to justly estimate the importance of any historic epoch, or to judge fairly of the life and work of any commanding individual without studying the environment, the period in the world's history, and without keeping in mind the fact that all human events are relative, and pre-eminently relative to the great primal fact of man's gradual rise from his original condition of barbarism. If we could detach ourselves from the humdrum habit of every day, and in observing any striking human event, or any conspicuous human life, consider it as another milestone on man's upward course, we should gain at once a commanding point of view and be prepared to be more nearly just in our estimate and more sympathetic in our appreciation.

The universe is full of contrasts, but it presents none greater than that between man the barbarian and man the civilized being. Whoever has helped in any department of effort to widen the distance between these two conditions deserves our serious study. To fairly appreciate civilization, we must consider the condition out of which it has grown. To understand the abundance of the present, we must remember the poverty of the past. Think of the condition of man before he learned how to make a fire, the beginning, it has been said, of all civilization; before he discovered how to make glass, and, in more recent times, how to protect himself from the elements with gum shoes and waterproof clothing. Before 1628 he did not even understand the circulation of his own blood. He did not know how to make spectacles until the thirteenth century, and it was not until 1420—seventy-two years before this country was discovered—that he knew how to print a book. He did not understand the law of gravitation until it was demonstrated by Newton in 1684, and not until about that time did he have the telescope and the microscope. Before that date he had no accurate knowledge of the heavens, and none of the intimate tissues of his own body. He has had the steam-engine only since the close of the last century, the ocean steamship since 1815, the railway since 1825, the electric telegraph since 1835, the telephone since 1875. The germ theory of disease, the great corner-stone of modern surgery, was not applied in surgical practice till Lister's time, and was first used on the battlefield as late as the Franco-Prussian war. To-day man's stomach can be cut out and thrown away with the chance that he may live, and with the certainty at least that he can have no more indigestion. New discoveries come so rapidly in these days that to-morrow we might almost expect that his soul will be taken out and analyzed, and put back with the certainty of keeping on its heavenly course.

Try to think for a moment what all this means,—of the clear gain to humanity at every turn,—and then comes a fuller realization of the value of every useful life and a keener appreciation of what we owe to every one who has helped to bring about this condition. Whoever he may be, we must credit him in his degree, and place him, even though in a modest niche, among the immortals.

Many of us go through life with very little appreciation of what it is to live in an age like this. We go about our affairs without remembering that civilization is recent, and that all the positive knowledge in the world has been secured to us only by the patient efforts of countless faithful souls, working in the dark,—for whoever faces any unsolved problem works necessarily in the dark. Therefore, we should be more ready to honor all pioneers in the world, in all departments of effort. History can never be read intelligently without keeping in mind the primal fact of man's gradual rise from barbarism, and it is dry and uninteresting if not read with an appreciation of those qualities in man which have made it possible for him to so rise. The world becomes wonderful to us if we people it with heroes. Unhappy, indeed, is he who has no vestige of hero-worship in his blood. Human life becomes tame and uninteresting when it can be content with material things, but inspiring and uplifting when concerned with the spiritual forces that underlie and make possible all progress. Heroes are always enthusiasts. An apathetic one is inconceivable. A "lifeless leader" is a meaningless term. There can be no greatness without enthusiasm. All the great things that have been done in the world have been done with enthusiasm. A study of the lives of any or all of the great men of the world will reveal, in all, the existence of an enthusiasm without which they could not have been great.

Buddha and Confucius were real men who lived on the earth and walked and talked with their fellows, and they are alive to-day because of their enthusiasm. The followers of Buddha number over a third of the human race. In all languages Jesus has been called the "Divine Enthusiast." Homer was blind, but who ever saw more and sang better, or with more enthusiasm? He was human to his heart's core, and his enthusiasm could not be confined to his time or country, but rings like a divinely sympathetic hello! down the centuries.

In our day Socrates would be called a crazy crank, but his "Apology" will touch the souls of men until the earth is as deserted as its moon. Plato was ablaze with the same fire, and to-day men warm themselves in the glow of his intellect as in the rays of a central sun. His enthusiasm will be contagious as long as men can reason.

It is impossible to think of Raphael as a stockbroker or an expert in real estate. His enthusiasm for beauty was so great that his work is to-day more real than any spacious mansion on earth, and will be more lasting than any pile of stones and mortar the hands of man ever fumbled with.

Palissy, reduced to poverty, burned his furniture, even his bed, in his search for a certain glaze, and because of his enthusiasm was

finally rewarded with success; and to-day his potteries in the Cluny Museum in Paris are without price. It would break the heart of France if they should be destroyed.

Dr. McKellops's enthusiasm for his profession was of the same kind. If it is too much to couple him with the great men of the past, it is not too much to think that his tenacity of purpose and his faith in the things in which he believed may have been as great as theirs. From first to last, he believed in himself and in his mission on the earth. Whatever his shortcomings or his transgressions, he must be supremely honored for this.

It seems to be a modern habit when a man has passed away to dwell upon his virtues, to exalt his worthy traits, but at the same time to coldly estimate the value of his work and to critically review his life. The latter I shall not attempt; that must be left for those who knew him better than I could ever know him. But I am glad to emphasize his virtues and to extol his worthy traits. From the earliest days of my acquaintance with him I believed in him, because of a certain force of character and a certain seriousness of purpose which, as I said before, was perhaps not always apparent on the surface. Deep down in his heart his enthusiasm glowed and burned, unquenchable as the sun which never fails. Early and late, in season and out, he was always ablaze with it. No city was too distant, no journey too disagreeable to keep him from attending a meeting of his professional brethren, and it is not possible to think of any of the great meetings of the past without his face and figure coming first to mind. Whatever else may be said of him, he will be honored for this through all time to come. Long after his dogmatisms and his whims have been forgotten, this divine quality will shine out bright and clear.

In the final estimate, a man's personal peculiarities count for very little. In considering the real influence of his life, his little weaknesses are easily overlooked and forgotten. His taste in dress becomes of no consequence by the side of the large things of life. He may be careless or the very pink of perfection, austere or luxurious, it matters not when the final summing up is made. We shall always love him for what he was, but we shall love him still more for what he did.

It is startling to think of him as an officer in the Mexican War. Think of the condition of our profession at that time! This must be done in order to make a just estimate of his attainments, and to assign him his proper place among the founders of the dental profession. The conditions existing then might well be likened to the conditions of barbarism that preceded civilization. He entered the profession during its stone age,—that is, when dentists stoned each other,—and he lived to help inaugurate the gold age, when they emulate each other in the practice of the golden rule. To-day a man who will not take the profession into his confidence, and explain his methods, and make known his discoveries, is passed by as if he did not exist. He misses the opportunity of making himself famous, and, though he does not know it, makes himself infamous.

One of the peculiarities of civilization is that it never loses anything of real value. Man's control of the forces of nature once gained can never be relaxed. The printing-press, the steam-engine, the telegraph can never be lost. The man will never live who will be in at the death of dentistry. There are now few living who were in at its birth. It was born sixty years ago, and Dr. McKellops worked with all his might and main as one of its chief accoucheurs. As the baby grew he assumed the rôle of foster-father, and no child ever had a better parent. He could commend and encourage, but he could also punish, as those caught in unprofessional conduct will remember. Probably no man did as much as he to break up the well-intended but pernicious habit of writing premature letters of commendation for this new thing and that.

In every sense of the word he was a pioneer. So far as I know he never made any great discoveries, and his name has not been associated with any epoch-making inventions; but he was always in advance, and always on the alert for what was new, and always prompt and generous with praise and appreciation of any new thing that could help in his work. His office was said to be a museum of new instruments and new devices. I have been told the amount of money he spent on new devices was almost incredible. From the earliest days his office was always open to any one who desired to learn. It was never my privilege to know him there, but I never met him at any of the large annual meetings that he did not have in his trunk some new devices that he took delight in showing. Countless times have I been taken to his room in his hotel and shown new things, and with as much interest as if they were his own inventions. I have many times heard men say they came to the meetings because they knew "Mac" would be there. I always received encouragement and inspiration at his hands, and always felt that it was a real loss to miss one of the annual meetings. At the next meeting his first remark would be, "You were not here last year." He seemed to keep a mental record of those who were faithful and those who were not.

What is the real thing in human life, anyhow? I know of no better answer than this,—*to help those who need*. Measured by this standard, Dr. McKellops's life was a conspicuous success. I am tempted to quote here a famous verse,—Lord Houghton's, I believe; it was called to my attention in this connection by Mr. Evans:

"He is happiest, bravest, best,
Who from the task within his span
Earns for himself his evening rest
And an increase of good for man."

This is the proudest moment of my life, and yet one of the saddest. I am proud of the marvelous achievements of dentistry; I am proud to be a member of a profession that has done so much for the health and comfort of humanity; I am proud of the gifted men who have devoted themselves to its advancement; above all am I proud to have had the acquaintance and friendship of Dr. McKellops for a period extending over a quarter of a century.

But to-night there is an undertone of sadness in my heart that I cannot escape. It has haunted me ever since Dr. McKellops's death, which was like the falling of some giant tree, after which the forest could never again be quite the same.

Of those identified with the infancy of dentistry, there are now not many left. Let us love and honor them while we may. The news of Dr. McKellops's death came to me in a singular way. I was entertaining Dr. Gordon White at dinner with my family, and mention was made of Dr. McKellops. Dr. White startled us by saying that he had seen him only a few weeks before, and that his condition was such that he would not be surprised at any moment to hear of his death. After dinner we sauntered into the parlor, and there on the piano lay a telegram from Dr. Fuller announcing Dr. McKellops's death. The telegram must have been received at about the exact moment of Dr. White's ominous remark, and the servant, not wanting to interrupt the dinner, laid it on the piano where it would be seen as soon as we entered the parlor. In the same room years before Dr. Hodson had presented to him the loving cup from the First District Dental Society, and here on that occasion he had lingered with Dr. Dwinelle and Dr. Walker until the large hours of the morning to christen it.

While he was living I had great affection for him; now that he is dead I have profound reverence for his memory. If he did not understand the measure of my regard then, I have the abiding faith to believe he understands now, and I give him a little wreath of love in the form of a sonnet which I inscribe to his memory:

God sometimes makes his purpose known to men
Through great achievements of some gifted man,—
Some strong true soul triumphant in the van
Of those who help or lead with voice or pen.
Half hidden in the mists of the unknown
A need evolves, and lo! a man appears,
Predestined for his mission through the years
And ever ready when the way is shown!
And so the pressing centuries unfold,
And step by step is man made more secure
'Gainst fear and pain,—twin demons known of old,—
And richer far in blessings that endure.
Thou wert, O Master! ever in the lead,
Thy chief concern a new profession's need.

Dr. B. HOLLY SMITH, of Baltimore. Mr. President, I feel grateful to this society for the courtesy of an invitation to attend this meeting. I feel proud that I am involved with you in the purpose to do honor to one whose life was one ceaseless effort to honor and build up our profession.

The last speaker (Dr. Perry) has so fairly and frankly, so eloquently and ably pictured the potent influence of Dr. McKellops's life and work that I am quite content to let that stand as the most graceful tribute that we could offer; and yet, "May we not mourn,—we that loved him so? His hopes were ours, his triumphs were our pride." As each loved for himself, so each his own sorrow may tell. My love for "Mac" is my excuse for adding a word; and sweeter and more beautiful than the music of the

sweetest singing-bird, broader and farther reaching than old ocean's roll, is the thought and inspiration of human friendship! "Mac" was my friend. I loved him because he was "Mac" and I was one whom I thought he loved.

Years ago, when I was a boy and came out of college, Dr. Winder asked me to deliver an address of welcome to the Southern Dental Association, which met in Baltimore. I did not have a fair conception of what the Southern Dental Association was, or of what any dental association was; but after the meeting was over I knew it, principally and largely through my contact with the man who stooped down to me, a boy, a stripling, touched me with his magnetism, with the generous outpouring of his loyal spirit, which had but one object,—the furtherance of dentistry and the development of the best principles for its guidance.

Mr. Chairman, from that day to this I have loved him and been in touch with him. I imagine that we have all known him. I imagine there is not anyone here who has not known him. It occurs to me that, now that he has passed away, possibly it would be better that his history should be written and not spoken. As Damon to Pythias, as Jonathan to David, McKellops was to the dental profession. He loved its interests, encouraged each traveler on a new way, each man who knew not whither to go, carefully protected, assisted, taught, inspired. "Mac" dead? No; I prefer, Mr. Chairman, not to think of Dr. McKellops as one who has passed me down the stream of life, whose form, shrunken by disease and wasted by time, sunk with its boat out of sight; but one who with me rowed up the stream, who passed me, made his landing, and to-day I see him, and will never look on him otherwise than as dear old "Mac," standing on the shore, his handsome face wreathed in that old smile we loved so much, beckoning, "Come on, you pretty thing!" That was "Mac." That was the "Mac" we loved, and the influence we will learn to admire in the days that shall come. May we not in this dark hour gather an inspiration from Browning?—

"My own hope is a sun will pierce
The thickest cloud earth ever stretched.
I see my way, as birds their trackless way.
I shall arrive—what time, what circuit first,
I ask not; but unless God send his hail
Or blinding fire-balls, sleet or stifling snow,
In some time, His good time, I shall arrive.
He guides me, and the birds, in His good time."

W. J. TURNER, M.D., D.D.S.,
Editor New York Odontological Society.

FIRST DISTRICT DENTAL SOCIETY OF THE STATE OF NEW YORK.

THE First District Dental Society of the State of New York held a regular monthly meeting on Tuesday evening, December 11, 1900, at the New York Academy of Medicine, No. 17 West Forty-third street; the president, Dr. William C. Deane, in the chair.

INCIDENTS OF OFFICE PRACTICE.

Dr. W. D. TRACY. I came prepared to show a little skeleton plate to illustrate a method of using Logan crowns in metal plate work. I think it is pretty generally recognized that the bicuspid plate teeth as furnished by the dental supply houses are not all that they ought to be, especially from the anatomical point of view; and in order to get a grinding surface that was adequate, and one which would not display the gold, I have for some time been using Logan crowns in such work. In fact, I used them before I became familiar with the saddleback plate teeth,—and in this connection I may say that I think the saddleback plate teeth are the best for that purpose. A saddleback plate tooth is one which has a large articulating surface in contradistinction to the others, which have a small surface only. They fill the space very nicely, and work up with a nicer finish than the other bicuspid teeth.

I do not know that there is anything original about it, but I will briefly describe the method I refer to. The first step is to get a bicuspid crown that is best adapted to the space, shade, expression, etc., and then cut off the pin. The little depression around the base of the pin is then filled up flush with gold foil, after which the tooth is ground so that the cervical edge at the buccal aspect comes nicely up to the plate; then, to allow the solder to flow in nicely, it is beveled off at the palatal surface, leaving a V-shaped space, into which the solder will run. If there is any difficulty in having the solder flow freely, a little gold foil may be put in to coax the solder in nicely. A Logan crown used in this way gives the desired articulating surface, a better esthetic effect, and a natural feeling to the tongue, and if those who have not used the method will try it, they will have considerable satisfaction with it, I am sure.

Dr. HART. In investing the teeth, how does it protect the teeth and yet allow space for the blow-pipe to act on the solder?

Dr. TRACY. This method does not give rise to any difficulty, and I invest in the ordinary manner, using sand and plaster, which seems to give the best results, the porcelain of course being covered as much as possible.

Dr. GOLDSMITH. Does the doctor have any difficulty from checking?

Dr. TRACY. I have not had that misfortune with the Logan teeth. I think if they were carefully heated up there would be no difficulty.

Dr. GOLDSMITH. I have used, and I know some others who have also used, the rubber teeth, removing the heads or flattening them out, making a thin platinum backing and flowing the gold in, letting the gold form the cervical part corresponding to the porcelain part of the Logan crown. I also thought that checking would be less likely than with the Logan teeth.

Dr. JOHN I. HART. I have had rather a unique case in practice, in that the first and second molars on the left side of the inferior maxilla lay in the normal position in the mouth of a male of about thirty years until about eight months ago, and then there was some slight separation between these two teeth, and a probe passed down

between them struck enamel. The separation increased, and finally two of the cusps of a tooth emerged from the gum. There was not much pain, and until that developed I did not feel justified in suggesting any particular procedure; but about six months ago there was some pain, and on passing a probe down I found that in the tooth that was emerging there was some little decay, and I treated that with silver nitrate. I wanted if possible to have this tooth extracted. I diagnosed it as a third molar out of position, but thought it was of the small type we sometimes see. I attempted to wedge the teeth apart sufficiently to have the third molar extracted, but I could not succeed. The patient went away last spring and I did not see him until about two weeks ago, when he came to the office suffering considerably, and it seemed wise to have the tooth extracted. Dr. Hasbrouck placed him under nitrous oxid, and then we found out how large this third molar was. It was necessary to extract a first molar to gain sufficient space to extract this third molar, which was erupting between the first and second molars. After extracting the first molar, it was demonstrated how the pressure had caused absorption of the distal root of this first molar, and that is rather interesting. The pressure was so great as to make a marked imprint on the mesial aspect of the root of the third molar. The third molar lay in that position [illustrating], so that after the extraction the socket was naturally very large,—deeper than it would have been if the tooth had erupted normally. I present for your examination the root of the first molar, so that you may see the absorption that has taken place.

Dr. HODSON. Was there any absorption of the second molar?

Dr. HART. As far as I can judge at present, I do not think there is, but you know how difficult it is to get down to the apex of a tooth at that time, when there is more or less capillary bleeding. I am almost free to state there is not, because if there were there would have been considerable irritation before now.

Dr. M. D. LEDERMAN, of New York, was introduced by the president, and read the paper of the evening, entitled "The Influence of Mouth-Breathing upon the Dental Arch." [As Dr. Lederman's paper has appeared elsewhere, we omit its publication here.]

FIFTH DISTRICT DENTAL SOCIETY OF THE STATE OF NEW YORK.

(Continued from page 952.)

THE following paper was then read by F. W. FISHER, D.D.S., Syracuse, N. Y.:

CROWN ESTHETICS.

Mr. President and Gentlemen,—That there is an increasing tendency toward the gold cap crown to the exclusion of the porcelain one is very evident. It is also plain that something should be done to discountenance this tendency; hence my desire to call your attention to the esthetic in crown-work. While there are many cases in which a gold cap is the only feasible restorative means, the employment of it promiscuously is deplorable.

The desire for a display of gold on the part of the patient—or of the dentist either, for that matter—is a relic of the barbaric love for adornment with gaudy colors and metallic ornaments, and on the part of the patient should be strenuously opposed by the dentist, whose duty it is to educate the public to a proper standard in esthetic dentistry. In nearly all cases judicious argument will convince the erring one that gold caps are far from being artistic, and that the nearer the substitute can approach in appearance the natural tooth the more admirable will be the results.

Unfortunately, the “beam” in the operator’s eye interferes seriously with the seeing of the “mote” in the patient’s. The aforesaid “beam” may be a lack of artistic perception in the dentist, or it may be a desire for an easier way of obtaining the dollar. Occasionally it is a choice between the gold and dollars, or No gold, no dollars. “There are others” is the patient’s motto. Let them find them. Be that as it may, the use of the gold cap is alarmingly prevalent, and should be frowned down.

In many cases perhaps it is unwise or undesirable to cut off the natural crown, and in such event a gold cap may be the only resource. Even in these cases there is a method of baking a thin overlay of porcelain on the caps, which in a great degree lends artistic quality to the operation. This method I have never tried, nor have I seen the results of such an operation, so cannot pass on the advisability of its employment. The open-faced cap, too, is a vast improvement over the all-gold one, but of necessity does not afford equal protection to the tooth beneath; but its employment where possible is plainly indicated.

Again, when it is essential that a gold cap should be used, the more the cap conforms to the original tooth the nearer the approach to esthetic results. A proper size, length, articulation, contour of cusps and of the cap generally gives to the case a certain mechanical beauty which goes far toward making up for the unsightly gold.

To be sure, there is an element of certainty about a gold cap, in that there is no facing to check in the operation of soldering or to break off after adjustment in the mouth. After a number of such occurrences,—and they usually come in bunches, like all unpleasant things,—one is tempted strongly to think that the cap is the only dependable thing, especially for bicuspid and molars. But, then, fortune smiles again, and all is serene. Look at the failures with such serenity as you can muster, and be, if you can, as philosophical under them as a friend of mine is, who always says when things go wrong, “Cheer up, the worst is yet to come!” Avoid under all circumstances the all-gold cap in the twelve oral teeth.

It may seem superfluous to talk thus to the men here assembled, but it can do no harm to call afresh to the mind the necessity of avoiding display, and also the wisdom of impressing the fact on the minds of the patients with whom we have to deal.

Porcelain, the only real substitute for the natural tooth-substance, is the factor in producing artistic results, and when properly employed approaches so nearly to nature in its appearance as to make the substitution scarcely perceptible.

Used as a facing in a Richmond crown, the results are very gratifying, and are as far superior to any obtained by the use of metal as can be imagined. The line of gold at the labial or buccal margin of the gum can be reduced to a minimum by cutting away the end of the root below the gum line and making the band very narrow at this point. A wide band is not necessary. Or, this portion of the band may be covered by baking porcelain body on it or overlaying the porcelain facing upon it. The porcelain-faced, gold-backed crowns, which have no band, of course do away with the possibility of gold at the gum line, as do also the all-porcelain crowns. To be sure, the lack of a band is a weak point, which varies as the fit is good or bad.

Any of the porcelain-faced crowns possess ordinarily the desired esthetic quality when used in the upper jaw, but for the lower jaw there is something distinctly lacking, especially in the bicuspid and molars. The masticating and lingual surfaces of these crowns are even more in evidence than the buccal, and thus in these situations the porcelain-faced crowns fall short of filling the bill. This is where the all-porcelain crown can be employed with markedly good results. From any point of view there is presented only the porcelain, and consequently an esthetic condition obtains. Even the band is out of sight practically, although the precautions taken for hiding it are not so great as in the anterior crowns.

To my mind, the banded Logan crown more nearly meets the esthetic requirements of the case than any other form of crown, whether it is used in the upper or lower jaw, anteriorly or posteriorly. The cap-band protects the root as perfectly as in the Richmond crown, and the all-porcelain crown does the rest. While the all-porcelain crown may fracture during soldering, it will not do so in use, and it consequently commends itself from that standpoint. This crown, the Logan banded crown, has all of the good features of the Richmond and none of the objectionable ones.

Now, of all the means taken to render the work as nearly natural as possible, the proper matching of the porcelain as to shade is the most necessary. No mechanical excellence can make up for a defective "match," although mechanical excellence goes far toward producing the desired result. A poorly made crown is an eyesore as certainly as one off color. From a combination of the two, "good Lord deliver us," even if we have to stand an all-gold crown.

It has not been my intention to go into the methods of crown-making at all, as that is an endless subject, and would not be within the scope of this paper. It is understood, however, that all or any crowns should be as nearly perfect mechanically as possible. An ill-fitting band, as well as being a failure mechanically, will cause a diseased condition of the gum and eventually disease of the periodontium,—this whether the band be too large, too thick, or forced too far under the gum.

Therefore, let me impress on your mind that there are four esthetic conditions connected with crown-work: The esthetics of color, the esthetics of mechanics, the esthetics of adaptability, and the esthetics of health.

In conclusion, let me state that I have been dealing throughout only with single crowns as such, and in no way with the kindred subject of bridge-work. But, aside from all-porcelain crowns, the foregoing applies as well to bridge-work.

Discussion.

Dr. C. H. BARNES, Syracuse, was pleased with the paper. It was pertinent, and the subject was so important that it needed to be frequently and forcibly urged upon the profession. He always had a feeling of disgust come over him when he saw a gold crown on a second bicuspid, or even a porcelain-faced crown. An all-porcelain crown, preferably a Logan crown, is much more artistic and satisfactory.

Dr. I. C. CURTIS, Fulton, said he wanted to speak of all-porcelain crowns. These were being used more and more as facilities for working with porcelain were improving, and he felt sure they had come to stay. With the electrical furnace as now made they can be constructed by any dentist, and if the necessary conditions are understood they can be made strong enough to be perfectly safe. When a banded crown is used, the band destroys the vitality of the gum as far as the band reaches. His method of inserting the Logan crown is to protect the root with a gutta-percha disk. He takes a disk of gutta-percha, and, having punched a hole in it, warms the pin of the crown and presses the disk over it; then, having prepared the root, enlarging the canal just enough to fit the pin closely, he paints the end of the root with chloro-percha and puts in the canal just enough cement to fill it. He then warms the tooth and presses it home. By this means perfect adaptation is secured. In five years he had only had one instance in which the root gave out, and this was a case where a Richmond tooth had been removed and the root had been weakened by the wear of the Richmond tooth.

There was no further discussion, and, on motion, the society proceeded to the election of officers for the ensuing year.

The result of the election was the choosing of the following officers: C. H. Barnes, Syracuse, president; S. Slocum, Oswego, vice-president; A. B. Wells, Skaneateles, secretary; I. C. Curtis, Fulton, treasurer; J. H. Dower, Syracuse, correspondent; F. R. Adams, Vernon, librarian.

In the evening, the society gave a complimentary banquet in honor of Dr. S. B. Palmer, of Syracuse.

SEVENTH DISTRICT DENTAL SOCIETY OF THE STATE OF NEW YORK.

(Continued from page 935.)

SECOND DAY—*Morning Session.*

THE meeting was called to order at 11 A.M., and, in the absence of the author, the secretary read a paper entitled "Dental Hygiene for the Public," by BERNARD S. BRONSON, Instructor of Sciences, Geneseo State Normal School.

This was a paper prepared by the author to be delivered in his course of instruction and before teachers' institutes, with the purpose of endeavoring to lead the pupils of the normal school and the teachers to a better appreciation of the necessity of oral hygiene and the means by which it may best be attained. The author's purpose in laying it before the convention was to submit the paper for criticism and improvement, and, on motion, it was referred to a committee for such correction as might be deemed necessary before it was returned to the author, as its having been read before the society would be, in a sense, an indorsement of the paper.

Dr. I. C. EDINGTON, Rochester, thought that the paper, used as its author intended to use it, would probably be a better means of getting this important subject broadly disseminated than any that a dentist or a dental society could influence. The author is a teacher of teachers, and educators are those who must understand the importance of oral hygiene if the children of the coming generation are to be benefited by the knowledge.

Dr. G. GOODE, Rochester, said that he was in hearty accord with what Dr. Edington had said, and that he was very glad the paper had been brought before the society. For some reasons, it is better that this subject should be presented before the schools by an educator than by a dentist. We know that when a dentist asks to address a school on the care of the teeth the feeling immediately arises that he will naturally get some personal gain out of it, but for an educator to present the subject is free from this objection.

Speaking of the means of keeping the teeth clean, Dr. Goode said that an objection to the use of floss silk was that as generally used it is liable to wound the gingival margins of the gum and set up an inflammation. He described a floss silk carrier of his own construction, which was so shaped that the silk could not be carried down far enough to wound the gum.

On motion, the subject was passed, and Dr. FRANK W. LOW read a paper entitled "Instrument-Case Sterilization—Instrument Sterilization—Stomatic Sterilization: How, When, and Why Each in its Turn Should be Employed."*

Discussion.

Dr. F. W. PROSEUS, Rochester, said he had used Dr. Low's sterilizer ever since it was invented, and considered it entirely efficient, but there were some objections. First, there was at times an unpleasant odor which was objectionable, though when patients once understood that this odor proved that the instruments were in a state in which they could not carry infection the objection usually vanished. Besides this, moisture is given out by the lamp, and unless the instruments were taken out and dried they would rust. He thought the machine did its work, but would be more convenient if improved in several ways. He asked Dr. Low how long it took to sterilize the instruments in a cabinet.

Dr. Low said the apparatus as put on the market was crude, and it had recently been withdrawn for improvement. He hoped that

* Printed in full in August issue, page 88r.

they would be able to overcome all objections. Much of the odor was from the wood alcohol formerly used; in the future they would recommend the use of Columbian fluid; this is a little more expensive, but is free from odor. There are several improvements contemplated which would make the apparatus more acceptable. As to the time necessary, ten minutes is sufficient for instruments in the box; in the case, about an hour is required.

There was no further discussion, and Dr. J. W. COWAN, Geneseo, read a paper entitled

COMPARATIVE TESTS OF AMALGAM IN ACTUAL PRACTICE.

The author stated that while Dr. Black's experiments with amalgams were conclusive as to their action under stress, etc., out of the mouth, he undertook no experiments to determine the comparative usefulness of different amalgams when placed in the mouth under as nearly as might be identical conditions.

This latter work is what Dr. Cowan has done, and his paper gives the results. He used four popular alloys to make his amalgams, and in several mouths placed similar fillings of all four amalgams, treating each one in accordance with the best methods in each case, and comparing the fillings at the end of six months.

The amalgams tested were Alba alloy, Welch's Gold and Platinum, True Dentalloy, and Fellowship, and the results in the first series of tests were as follows: "The margins of the fillings made of Alba alloy were not perfect, an ordinary magnifying glass showing a distinct seam, and the point of an exploring instrument would follow the margin. Wherever it could reach the margin, the color of filling was good. The filling made of Welch's alloy was distinctly better, so far as the margins were concerned, but the color was not quite so good. The Fellowship filling was very good indeed, it being just possible to find the margins with a sharp-pointed explorer, and the glass showed very little apparent shrinkage; but the color was not good at all. The True Dentalloy filling was to all appearance perfect, there being no perceptible change in the margins, the explorer point slipping over them as it would over the margin of a good gold filling; the color also was better than that of any other."

Discussion.

Dr. B. S. HERT said the work that Dr. Cowan had undertaken would yield valuable results to the profession if the tests were carried on further and were kept under the eye of the investigator for a longer time, but that these tests, both for the number of fillings and for the time they were under observation, were insufficient to determine finally the comparative value of the materials. True Dentalloy, he understands, is made of silver and tin. This will show best results in a short time, but the addition of a small percentage of copper gives some qualities which are valuable, but which would not be evident so soon.

Such experiments tried in many mouths and kept under careful observation for a long time would be very interesting as well as useful, as amalgams change, or are liable to change, as time passes, and six months is not sufficient time to observe the changes.

Dr. COWAN said that the reason he had not reported more of his experiments in full was that there had not been time. His object in making the experiments and in reporting them to the society was that the dentists should know who was giving them the material they wanted. Dr. Black has shown what is wanted, and the dentist only needs to know that it can be obtained, and where it can be obtained. He hoped that other dentists would carry out the same kind of experiments and report on them to the society.

On motion, the subject was passed, and the society adjourned to meet with the Eighth District Society in October.

NORTHEASTERN DENTAL ASSOCIATION.

(Continued from page 786.)

WEDNESDAY, OCTOBER 17TH—*Evening Session.*

THE meeting was called to order by the president.

Dr. H. W. GILLETT, of Newport, R. I., then read a paper entitled "Office Sterilization."*

Discussion.

Dr. JAS. McMANUS, Hartford, Conn. Dr. Gillett has read you a very interesting paper, and has given you authorities, medical and otherwise, on the matter of sterilization. He has gone into details; he has told you how to do things in a very nice way, and he makes a very pretty point in this paper about the condition of the dental cabinet; but I think there are not many of us here to-night who would care to have our cabinets inspected by people who want to find fault with us. I am sure we would not stand a chance with such people. I remember, going back quite a long time, that the gentleman I was associated with as a young man, when I commenced with him as a boy, was very particular to see that I polished his instruments certainly twice a week. Now, as many of the steel instruments had wooden or bone handles, he insisted that they should be also polished. I do not think that he or any other dentist knew of bacteria. I do not think, in looking back, that I ever did myself. I do not think much of these bacteria nor of this sterilization, although we have in our office two sterilizers. I cannot see for the life of me the need of all this sterilization. I can see the necessity of the lance being perfectly clean, but I believe that if that lance is washed thoroughly and wiped there is not very much danger of infection. I cannot see why files should be kept especially clean, for when a man puts a rubber dam on, what earthly chance is there for any one of these instruments to do any harm if you wash them and put them back? I do not believe in having these fancy offices, double offices, built in Spain or somewhere else. I do want every man to have a wash-bowl and running water if possible in his room, and wash his instruments carefully before operating; and if he does this I do not think there is going to be very much danger of doing any damage from infection.

*Printed in full in May issue, page 457.

Dr. D. B. INGALLS, Clinton, Mass. I do not feel competent to enter into this question, but will simply state my own practice. I have been in the habit for a good while of taking the instruments I have used for any one patient and boiling them, wiping them clean, and putting them back in their cases. I have done this right through. It certainly cannot do any harm to see these things and to try to understand them in their fullest extent.

Dr. GILLET. I wish to ask Dr. McManus if he thinks a clean hypodermic syringe an essential. In one of our Atlantic states there is living to-day the honored wife of one of the leading surgeons of this country in a condition which causes her to be a continual sorrow to herself and her friends, simply because a dentist failed to sterilize his hypodermic syringe after using it in a pus-cavity.

I have said nothing in my paper that I did not mean and believe. The neglect of effective sterilization is bringing more than discredit upon our profession. How many of us would like to have a bur just used on a tuberculous patient wound the gum in our own mouth? How many of you pay any attention to the chronic diseases with which your patients may be afflicted? Do you not all prefer to have the rubber dam applied at once when an operation is to be done in your own mouths, in order that possible contamination may be kept out?

As a student, I was taught by one of our prominent men that sterilization was entirely unnecessary. He had a cabinet in which he aimed to have a place for each instrument, and he returned each instrument to its place immediately after using. I am glad to say he does differently now, and I do not believe my friend Dr. McManus wants to say anything in favor of such practice as that. If we are to make any pretension at all to being an intelligent profession, we must pay the same heed as the surgeons do to asepticism in our work. In the case I have just referred to the patient has lost a large part of the upper maxilla, and is permanently deformed. With such possibilities before us, it is imperative that we take every possible precaution. In a large part of our work it makes no difference whether the instrument is sterile or not, but the only way to be prepared for the case in which sterile instruments are needed is to have *every* instrument sterile before it is used.

Dr. McMANUS. I either did not make myself clear or Dr. Gillett did not understand me when I said a clean instrument. If an instrument is clean, I believe it is sterilized, and I do not care what any other man, surgeon or not, says. When an instrument is clean, it is sterilized. Wherever it is to touch the gum-tissue, it should be more than clean. When the rubber dam is on, there is no possible danger. There is danger if one is cutting, and the instrument should be wiped after it has been used. Every instrument should be thoroughly looked at and be clean before it is used. I do not believe in two-thirds of what I consider "rot" in this matter of sterilization. The doctor has given you authorities on the subject. I respect his opinions, but I think differently. He does all these things from the very highest motive, the cleanest motive, but

he believes a great deal more than I do, and he has a right to do so; but when it comes to saying that these things are dangerous, when you say that an instrument which has been washed and wiped is not clean, I do not believe it. I believe in a man having clean instruments, so clean that in my opinion it is sterilized, and that there can be no danger in using it.

Dr. GILLETT. I do not think it is essential that I make any other statement in regard to the question. Apparently when Dr. McManus says clean he means what I mean when I say sterilized.

A MEMBER. A year ago I had a patient inquire about certain poisons from dental instruments. She did not give the details of the work performed. In a day or two her lip and face were swollen up badly. She was very much alarmed, and thought it was poison. I asked her if the rubber dam was used, and she said "yes." I did not think there was any such thing as rubber poison, but the fact was that it had gotten into a cold sore and that made the trouble. At that time I questioned this very much, but I have seen accounts of it in the journals. We have got to keep these things in mind and apply ourselves and raise ourselves above reproach. The reason why I do not say anything is that I am aware that I am not up to the point I want to be, and I am waiting for the right method to be given us and for the ideal, or at least the practical, method to help us out of this difficulty.

Dr. SHAW, Springfield, Mass. I have worked in conjunction with a bacteriologist in our city, and I took some instruments which might be called clean, as they were washed in the old-fashioned way, and immediately placed them in sterilizing tubes. Others I boiled in a solution of carbolic acid,—about ten per cent. Another set of bars and excavators were placed in formaldehyd solution of six per cent. Those instruments were carefully handled in the sterilizing tubes, but Dr. Eames made cultures from them, and there was a whole host of microbes. A great many kinds were produced, but the greater growth was from those instruments that were simply wiped clean,—first washed in warm water and wiped in the ordinary way. After boiling five minutes, these instruments were nearly sterile, but there was a great growth of the micro-organisms from the instruments which were simply washed and wiped off.

Dr. C. T. STOCKWELL, Springfield, Mass. I would like to ask Dr. Shaw if he finally succeeded in providing Dr. Eames with instruments which proved to be absolutely sterile?

Dr. SHAW. Yes; we boiled them seven minutes. Five minutes' boiling did not render them entirely sterile; at seven minutes' boiling they were. When they were left five minutes by actual time, and taken out and each instrument was placed in the sterilizing tube and taken to the laboratory, we found that a culture could be made.

Dr. STOCKWELL. Then Dr. Morrison's judgment was that that was a sufficient length of time?

Dr. SHAW. I do not know. I would not care to say.

Dr. GILLETT. If I might say just a word: So far as I know,

no authority has advised so short a time for boiling. It has been recommended that fifteen or twenty minutes be the time, and I believe that is now the accepted standard.

Dr. SHAW. The object of this five-minute boiling was to establish that the ordinary boiling would suffice. We know that with some microbes it becomes necessary to boil thirty minutes, and there are others which may be destroyed in less time. It is not often absolutely safe to say five minutes.

Dr. GILLET. In my paper, I did not attempt to deal particularly with individual instruments, but with the office as a whole. Many who suppose that they are sterilizing their instruments, fail to do so. Some of the objections to the boiling process are the kind of handles supplied for our instruments, the length of time it takes, and the fact that our patients succeed each other and expect us to receive them the moment the preceding patient goes out of the door. Then, again, many of our instruments are ill adapted to boiling. As the matter of the particular management of the instruments has come up, I would like to speak of some things Dr. Wm. H. Potter, in reply to a letter to him, has mentioned. In his reply he describes his present practice, which, as a method of procedure, may be of interest to you. Dr. Potter has been a rigid follower of the boiling process. He now uses a rectangular, porcelain-lined, steel asparagus-cooking dish, which has a perforated tray which goes to the bottom of the dish and has handles reaching to the top. Into this he puts several inches of water and adds a teaspoonful of pearline soap and an ammonia compound to prevent rust. The water is brought to a boil, and the washed instruments are placed on the perforated tray, lowered into the boiling water, and boiled for twenty minutes, or, if used for tuberculous patients, for thirty minutes. Mouth-mirrors he washes with soap and water, dries, and places in a formalin sterilizer for at least thirty minutes.

This may be considered absolutely safe, but is not always possible as dental offices are managed at present.

UNION MEETING OF THE DISTRICT OF COLUMBIA DENTAL SOCIETY AND THE MARYLAND STATE DENTAL ASSOCIATION.

(Continued from page 943.)

Dr. M. C. SMITH, Lynn, Mass., read a paper entitled "Observations Among Dentists at Home and Abroad."

Dr. Smith's paper was a pleasant and interesting description of many incidents of a trip from his home through the principal cities of Europe, with a divergence into Africa, and he describes some experiences among dentists in various parts of our own country also. In his wanderings he was an indefatigable searcher after information, and his descriptions of places and persons were highly appreciated by his hearers. His necessarily lengthy paper, however, consists too largely of personal matter to render feasible its publication in the DENTAL COSMOS.

In England, Dr. Smith found it usually difficult to gain access to a dental office, and some of the dentists upon whom he called did not seem to feel there was any reason to treat a visitor who called in a purely fraternal spirit with more than scant courtesy; but in Continental cities he was almost overcome by the hospitalities and cordial reception he received, especially from the leading American dentists.

Returning to London after completing his Continental tour, he spent some time visiting hospitals and dental schools, which are usually connected. He states that while the medical and surgical education is complete and in every way worthy of the highest praise, the feeling there seems to be that the dental department is far below the others. He says, "In each school they were willing to show me their surgical department, and some of them were willing to show their laboratory, but not one was willing to show the operating room; and if I looked into the operating room every student, as with one accord, stopped work and remained stopped until I got out." He thinks that in surgery the English are far ahead of the Americans, but in dentistry far behind.

This brief summary of some few of the points of Dr. Smith's long paper must, of course, omit his most interesting descriptions of his personal intercourse with prominent men both abroad and at home. He certainly had "a good time," and the society enjoyed hearing the recital. On the conclusion of the reading the members expressed their feelings in a vote of thanks.

Dr. THOS. J. JONES, Washington, D. C., then read the following paper:

COCAIN AS A LOCAL ANESTHETIC.

Knowing full well the prejudices that have existed and those that still exist against cocain and its use as a local anesthetic, I venture this paper upon this society, praying for your most charitable consideration. What I shall have to say in advocating the use of cocain as a local anesthetic is based upon facts obtained during ten years of practical experience in thousands of cases.

During the ten years I have had an extracting practice averaging over five a day. During the first seven years I used a four per cent. cocain solution, together with menthol, alcohol, and distilled water. For the past three years I have used a one per cent. solution. In a practice so large, and extending over so many years, it can be readily understood that all temperaments and all sorts and conditions of cases are met. While using a four per cent. solution I observed a toxic effect in about ten per cent. of the cases, varying in degrees of intensity, but a very few cases were so severe that restoratives were resorted to. Since using a one per cent. solution, together with morphin, no toxic effects have been observed, except in cases wherein I have been able to attribute the condition to other causes. No case has come to my knowledge wherein the patient has experienced any depressing, "fainty," or toxic effect after leaving my office.

I might occupy your time in enumerating many cases of varied

condition, but I will in this connection call your attention to but a few illustrations of how cocain gets its bad name.

At a meeting of a local dental society I recommended the use of a local anesthetic to relieve the pain in cases of replantation, and when it was learned that cocain composed one of the principal ingredients in the anesthetic recommended I was much surprised at the upbraiding I received from one of the most learned gentlemen in the profession. He assured us that statistics showed that there had been more cases of death caused by cocain than by the use of any other drug in dentistry, and that it should not be used hypodermically; that it was extremely dangerous to the patient, and liable to ruin the reputation of the practitioner. After the meeting adjourned he admitted to me that he had never injected cocain into the tissues, nor would he under any circumstances.

Permit me to say right here that, as far as I have been able to learn, none of my patients have died from its effect, and my professional reputation,—well, if it is ruined I will swear that cocain has not done it. Many of the evils attributed to the use of cocain in cases of minor surgery are due to a variety of mistakes or misunderstandings. For instance, I was told a few days ago by an intelligent gentleman, referring to a case with which I was quite familiar, saying that the trouble came from cocain injected,—when the tooth was taken out, that the doctor, a noted specialist in the city, removed a piece of cotton from the patient's ear that had been in for several days, and he could smell the cocain so strong that he told the patient that the cocain that was put in his tooth was the cause of the trouble. The true story is that a dentist had extracted an ulcerated tooth; necrosis of the superior maxilla had set in, and he advised the patient to consult a specialist, as the case was beyond his skill. The patient consulted a specialist, who placed a treatment in the antrum and left the city, leaving the patient in charge of another specialist, who upon removing the cotton from the ear detected a strong odor of—not cocain, but iodoform.

Miss B. came to my office, and a tooth was extracted with the four per cent. solution of cocain above described. She left the office apparently perfectly well and in good spirits. After reaching home she was taken ill. Her physician, on being informed that a tooth had been extracted and that cocain was used, pronounced the malady cocain poisoning. The mother came to my office and cancelled the future engagement, and gave me to understand that I had nearly caused the death of her daughter. A few weeks later, however, discovering her mistake, and with an unusual sense of justice, she came again to me, and apologized for what she had said, as she had learned that the girl had suffered several similar attacks while away visiting during the summer, and that after the extraction of a tooth, no anesthetic having been used, she was desperately ill after reaching home, and for several days her life was despaired of. The appointment was renewed, and I have extracted for her since and for other members of the family. In every case they insist upon the administration of cocain, and it has been used with no bad results; and they have brought many patients to me recommending its use.

Mr. C. came to my office, and after extraction of a lower right first molar, although the operation was not severe or prolonged, the patient sank into such a comatose state that it became necessary to resort to artificial respiration and powerful restoratives. It was nearly three hours before he was able to leave the office. In this case no anesthetic was used.

Miss L., seated in the operating chair for the purpose of having a tooth filled, fainted before I could make an examination. So severe was the paroxysm that when she had apparently partially recovered she lapsed into another swoon, seemingly more intense and of longer duration. After the fourth, however, she had sufficiently recovered to be able to leave the office. In this case no anesthetic was used. Another visit met with the same result. A third attempt faring no better, I had to refuse to attempt further operation.

I could go on and enumerate many cases that have shown symptoms common to toxic effects, yet which have not been due to the use of any drug. Had a local anesthetic been used, the cocain would have received all the credit for the bad effects presented.

Contrary to the general opinion of the members of the dental profession, I feel that the use of a one per cent. solution of cocain, together with morphin, etc., produces in all cases a stimulating, tonic effect, that leaves the patient stronger, brighter, and—being relieved of pain—happier after the operation than before. This subject should be investigated by every conscientious dentist. We owe it to our patients that every method not endangering life be used for the alleviation of human suffering.

Discussion.

Dr. W. A. MONTELL, Baltimore, said the use of cocain was an important subject, and he was glad it had been brought before the meeting, as there was a great diversity of opinion among dentists as to its advisability. He favored its use in a low solution, as advised by Dr. Jones. In 1885 he began its use in a five per cent. solution, as was then generally advocated, and before very long he had a case which exhibited the toxic effect of the drug. The effect was shown in paralysis of the tongue. He was alarmed, and for a while discontinued its use, but afterward employed it extensively in the combination of one grain of cocain, one-eighth of a grain of morphin, and one two-hundred-and-fortieth of a grain of atropin. This combination made into a tablet was dissolved in a half ounce of water, making about the one-half of one per cent. solution. He injects this into the submucous tissue where the peripheral terminations of the nerves are, and allows it to remain six to eight minutes before he extracts. This will give almost complete anesthesia. He had recently tried chloretone with good effect.

Dr. WM. A. MILLS, Baltimore, said a gentleman came to him some time ago who had had a tooth extracted with the use of cocain as an anesthetic in New York some days previously, and whose mouth was troubling him very seriously. Upon examination a slough was found not only in the gum, but in the cheek in the neighborhood of the tooth. He treated it with peroxid of hydrogen,

and in two or three weeks effected a cure. He thought cocain too uncertain in its effects, and too dangerous to be injected into the tissues of the mouth.

Dr. MONTELL asked if the peroxid did not destroy the tissue.

Dr. MILLS said that it was diluted, and had no bad effect.

Dr. JOSEPH ROACH, Baltimore, asked Dr. Jones if he had any ill effects from the injection of cocain now. Dr. Jones said not since he used the one per cent. solution. When he began using cocain he used four per cent. solution, and had toxic effects several times.

Dr. ROACH said he had trouble following the injection of about two minims of five per cent. cocain, and it took two and a half hours' hard work before the patient came round. He knew of several dentists who had had patients to fall in a faint directly after leaving the chair, or a few minutes after. He now uses a two per cent. solution; and while he had never had trouble from this weaker solution, he was generally unwilling to use it, as he never felt that it was quite safe.

Dr. MILLS spoke of a case he had seen reported where a physician had in a case of neuralgia painted the temple of a patient with a four per cent. solution, and the patient nearly died. He thought it exceedingly dangerous.

Dr. JONES said the case of sloughing that Dr. Mills described might have been like a case in New York where there was a suit for malpractice, and the dentist admitted afterward that by mistake he had injected zinc chlorid instead of cocain. When he has a number of teeth to extract, he injects the cocain around all of them first and extracts all at once. As far as his experience goes, this formula may be used *ad libitum*:

Sulfate morphia, $\frac{1}{3}$ gr.;
 Muriate of cocain, $3\frac{1}{2}$ gr.;
 Listerine, $\frac{1}{4}$ oz.;
 Pure salt, 1 gr.;
 Distilled water, $\frac{3}{4}$ oz.

Dr. MONTELL asked what means Dr. Jones takes to keep his needle always aseptic.

Dr. JONES said, as the vehicle was an antiseptic, it was not necessary to take more than the ordinary measures to keep it clean, as with reasonable care it would be always aseptic.

The subject was passed, and the convention adjourned till evening.

SECOND DAY—Evening Session.

The convention was called to order at 8 P.M., and Dr. WM. A. MILLS, of Baltimore, read the following paper:

LA GRIPPE: MULTIFISTULOUS ABSCESS OF THE ALVEOLAR PROCESS.

Several months ago we read a paper before the Baltimore County Medical Association, entitled "La Grippe Odonto-Metastasis," in which was described some of the peculiar characteristics of the lesion, the most important point being that while the symptoms indicated a dying, suppurating, or gangrenous pulp, all of the usual clinical signs were wanting. The teeth were tested and found to

have living pulps, yet on recovery from la grippe were discovered to be devitalized.

Your attention is now called to another pathologic condition which has been attributed to the same malady.

Case 1. Miss H., aged thirty, of nervo-bilio-lymphatic temperament, sought relief from what was thought to be an abscessed tooth. The subjective symptoms were as follows: While convalescing from an attack of la grippe which had involved the upper air passages and bronchial tubes, she became conscious of an increased sensitiveness of the left cheek just below the malar process, which she attributed to "a cold in the face." This continued for twenty-four hours, when it was followed by a throbbing, tearing, crushing, and burning pain just beneath the antrum of Highmore, which lasted five or more days with increasing severity, when the mucous membranes surrounding the molar teeth became so greatly infiltrated that deglutition was almost impossible, while mastication was but little impeded.

On the sixth day the abscess spontaneously opened, discharging quite a quantity of sweetish pus. Following this, the patient partook of food, had a night's rest of undisturbed slumber, and early next morning called at the office.

On examining the oral cavity, the following objective features were observed: The mucous membrane covering the alveolar process of the left superior maxilla, from the first bicuspid tooth to the tuberosity, was bluish purple in color, and looked like a collapsed bag, while the tissues of the fauces resembled a case of chronic naso-pharyngeal catarrh.

Three large fistulous openings were found,—two near the base of the palatal arch, one on either side of the septum of the second and third molars, and the third on the line of the same septum, but on the buccal surface, a little below the base of the floor of the antrum of Highmore.

There was no elongation of the involved teeth, but little tenderness in closing the jaws, or from concussion; only the teeth were slightly movable on lateral pressure. Thermal tests proved the teeth to be living. Two had never been filled,—second and third molars; only the first molar contained a small alloy filling in its anterior approximal surface. All the teeth were free from any indication of phagedenic pericementitis or salivary calculus. There was no discharge of pus from the nose or offensive odor from the breath.

As far as could be learned, there was no trace of any syphilitic or tuberculous infection, either hereditary or otherwise, and the family history being well known, any such supposition was *nil*. On exploring the fistulæ, all were found to lead to a central cavity lying just beneath the base of the floor of the antrum of Highmore, extending longitudinally from above the apices of the roots of the second molar to the apices of the roots of the third molar, and laterally from the buccal to the palatal plates.

A slight crackling was observed on pressure, but no destruction of either had taken place except at the seats of the fistulæ; the floor

of the antrum of Highmore had not been penetrated, but the base could be plainly felt. No sequestrum was found; all the conditions indicated a common abscess of the cancellated structures of the alveolar process.

Case 2. Miss D., aged fifty, of bilio-nervo-lymphatic temperament, had all the symptoms as described in case No. 1, except that there was one fistula more, making four in all, the fourth being situated in the gingival space of the first and second molars,—one of which, the second molar, had been treated some time previously for phagedenic pericementitis.

Case 3. Miss C., aged thirty, of nervo-bilio-lymphatic temperament; all the symptoms simulating those of cases 1 and 2 up to the day she called at the office, just at the time the abscess was about to discharge.

From the slightly infiltrated cheek no one would have supposed that the following conditions existed beneath: The three molars of the left superior maxilla were almost hidden from view by the greatly distended tissues, the tonsil and pharynx on the same side being also involved. The diseased membranes were of a bluish purple color, and looked as though on the eve of becoming gangrenous. The three points of threatened eruption resembled a fistula in actinomycosis, and when opened the lancet entered so deeply into the tissues that it was thought that the antrum of Highmore had been perforated, but such was not the case.

Quite a quantity of cream-colored pus, streaked with blood, was discharged; it was odorless and free from calcium deposits. The teeth involved were slightly movable, but gave little pain on pressure or concussion. Like cases 1 and 2, all the fistulæ were found to lead to a central cavity, and were of similar shape.

All the cases were successfully treated with Oakland hydrogen dioxid, using it in full strength as a mouth-wash, medicament, and for irrigating the abscess cavities; nothing else was deemed necessary, as by its chemic and mechanical action it sought out and separated the living from the devitalized tissues and their toxins, at the same time destroying the micro-organism which caused the disease, converting the whole into an inert mass, leaving the surface walls of the abscess cavities, after flushing, stimulated and aseptic, and thereby promoting healthy granulations and a rapid restoration of the lost parts.

Although the treatment was conservative, it was thought wise not to pack the abscess cavities with antiseptic gauze, etc., as recommended, because the remedy used prevented reinfection from any of the pathogenic organisms contained in the oral cavity. No constitutional remedies were given, as the patients were still under treatment by their physicians.

As all three cases were stricken while convalescing from the effects of la grippe, which had taken the type of nasal and bronchial irritations, it is believed that the origin of the abscesses was due to a combination of the Pfeiffer bacillus and *Staphylococcus pyogenes aureus*, which entered the blood current through the mucous membrane of the antrum of Highmore, tonsil, or gum tissues; colon-

ized in the cancellated structures of the alveolar process, and by their toxic effect so obstructed the process of normal assimilation and oxidation that a local inflammation was induced, causing the tissues to break down; and nature, in the effort to be rid of the noxious matter, set up a process of suppuration.*

Dr. A. B. Conklin says, "Whatever impairs nutrition, with resulting functional perversion, will go to the ultimate structural changes and final dissolution."

Dr. Howard S. Anders says, "La grippe in its symptomatic manifestations is the hysteria of epidemic disease. Its puzzling obscurities, unique development, grotesque variations, distressing complications, and surprising sequelæ make it, paradoxically, a type of the atypic in the class of infectious diseases, as is its functional analogue among neuroses. No tissue seems too hidden, no structure too strong, no function too stable, no organ too resistant, no organism too robust to escape its Briarean grip."

Discussion.

Two members of the Maryland State Dental Association had promised to discuss Dr. Mills's paper, but, as they were absent from the meeting, the subject was passed, after the following remarks from the author:

Dr. MILLS said he was sorry that those who had promised to discuss his paper were absent, but before the subject was closed he wished to state that during the past six months there had been in Baltimore an epidemic of la grippe, which seemed to show itself principally in a catarrhal condition of the mucous membranes. During the time of its prevalence patients had sought relief from many pains, supposedly of dental origin, which in the majority of cases were found to be reflex effects of la grippe and its sequelæ. In these cases a new field for diagnosis, prognosis, and differentiation has been opened to the dental practitioner.

The subject was passed, and Dr. C. C. HARRIS, Baltimore, read the following paper:

TRIANGULAR BAR BRIDGE.

The question of cleanliness has always been a disturbing element in the construction of bridges, and I have felt that the simple bar bridge is the ideal one. While the impossibility of decomposing food particles collecting under the bridge is of the greatest importance for the wearer's comfort and for maintaining the sweetness of the breath, it is no less essential that the cervical margins of the abutments shall be absolutely free. No part of the bridge should extend as low as the gum at the anchoring crowns.

The gum at this point of contact naturally forms something of a pocket for food particles and calcareous deposits. This is frequently observed at surfaces adjoining the space where one or more teeth have been extracted. Deposits of food and calculus at these surfaces keep the gum and bone inflamed and receding or separat-

*[Aug. 10. All three cases have visited the office since the reading of the paper. All the teeth involved were found to have living pulps, with the surrounding tissue normal.—WM. A. MILLS.]

ing until the very apex is reached, and in case of molars this nearest root loses its entire connection, while the other root is healthy and firm in its attachment.

The question arises: How are we to help matters,—to construct bridges in such a manner as to make it possible to keep these "space" surfaces clean and healthy. I think the bar bridge ideal, and yet there are serious objections. Of course I am assuming that such are suitable only where porcelain facings are not necessary for appearance.

The one serious objection to the simple bar is greater in the lower than the upper mouth. The objection is that in the management of the bolus of food with the tongue it is often forced under the bar and through the space, thus giving the wearer no little annoyance in eating.

This inconvenience and annoyance had to be overcome, and I hit upon the plan of making this bar a triangle, with the base for the grinding surface and the apex extending quite to the gum, leaving very little if any space between this narrow line of gold and the gum. You will see there is no undercut from either the outer or inner side for food to lodge, and the patient at least will have one-half the advantage of cleaning from the outside.

Now, I mean in future to incline the apex of the triangle more to the inner or lingual side, thus enabling the patient to have the under jutting surface "entirely buccal," where it can be readily reached with the brush and cleansing agents. No bridge can be constructed in so little time, and this is an important item of consideration. The easiest and quickest method of getting the articulation is to burnish a piece of pure gold to the surface of opposing teeth, which is always accurate and reliable, and then fold the outer and inner sides down and in, thus making the apex at the gum. I leave a small cleansing space at each anchorage.

This bridge is especially adapted to inferior cases, because of not being conspicuous, like the upper, making facings unnecessary. In the normal mouth, the lower buccal cusps articulate to the center and inside of the buccal cusps of the superior teeth, making it common to see the facings of lower bridges broken. My experience with these bridges has been entirely satisfactory.

I make no claim to originality, but have not seen such a bridge elsewhere.

Discussion.

Dr. JNO. H. LONDON, Washington, D. C., said the bridge described by Dr. Harris was one that would commend itself to every dentist. He had seen a case only a few days ago where the gums had grown up to cover one-third of the dummies, and it was exceedingly troublesome to cleanse the teeth and reduce the swelling. Indeed, so great was the trouble that finally the bridge was removed and one of a construction somewhat similar to that described by Dr. Harris substituted.

Dr. H. E. KELSEY, Baltimore, agreed with the essayist in recommending such a construction in bridge-work. The use of porcelain

facings in the posterior teeth was absolutely necessary, as they were not seen, and only formed places for the lodgment of *débris*, and frequently gave rise to inflammation of the gums. The advantages in cleanliness of the bar bridge were easily apparent.

Dr. J. K. BURGESS, Baltimore, said that Dr. Harris did not make it clear how he got the occlusion for this method, and asked him to explain this point.

Dr. HARRIS said he took a piece of pure gold and got the surface to occlude with the opposing teeth, then turned down the sides and filled solid with solder.

The subject was then passed.

(To be continued.)

NATIONAL DENTAL ASSOCIATION.

THE National Dental Association held its fifth annual meeting at Milwaukee, Wis., commencing Tuesday, August 6, 1901. The regular sessions were held in Masonic Hall. There was a large attendance, and the papers read were of a high order of merit.

FIRST DAY—*Morning Session.*

The association was called to order at 11.30 A.M. by the president, Dr. G. V. Black, of Chicago. Prayer was offered by Dr. Edmund Noyes, of Chicago.

Dr. G. V. I. Brown, Milwaukee, representing the mayor, then delivered an address of welcome, which was responded to by Dr. C. N. Johnson, of Chicago.

The president, calling Dr. M. F. Finley, Washington, D. C., vice-president for the South, to the chair, read his annual address, an abstract of which follows:

Tracing the history of the association from the organization of the American Dental Association, in 1859, Dr. Black spoke of its influence on thought and research work, and the stimulation which it has given to individual men to become better practitioners and the spread of this impulse to the general membership of the profession. It is not so much that we have wiser men in dentistry now than fifty years ago as it is that we have many more wise men. At the first meeting in 1859, ten organizations were represented by twenty-six delegates; in 1868, there were eighty permanent members and forty-eight organizations represented by delegates; in 1895, there were two hundred and fifty-five permanent members and fifty-three organizations represented by delegates. Then came the union with the Southern Dental Association, and the adoption of the name National Dental Association. In 1899, there were three hundred and ninety-nine permanent members and only twenty organizations represented. From this it would seem that the organization is losing its representative character and lapsing into a fixed organization controlled by its permanent membership exclusively. There are members from states having no official representation, and this organization has no official knowl-

edge that there is now any dental society organization in those states. To remedy this, Dr. Black suggested that the names of permanent members residing in states which for two years failed of official representation in the association should be erased from the roll. This association might also stimulate interest in its work by having a digest of the doings of the various local societies prepared by the corresponding secretary, as seems to have been the original intention; also, the Transactions may gain a wider circulation by being supplied to members of state societies on the payment of certain dues to cover the expense.

Discussing the literary and scientific work of the association, Dr. Black pointed out how it had grown until under the present plan of work there was not time to properly accomplish it in the four days devoted to it. He therefore proposed changes in the plan of work which would, in his belief, enable the association to do at least three times as much as now. The scheme was discussed at considerable length in the address, which was accompanied by a draft of a constitution to carry it into effect. The general scheme of organization, the representative character, branch meetings, rules of order, etc., remain the same as heretofore. Briefly summarized, Dr. Black's ideas were that the business methods should retain their present form, but be improved by expressing more definitely the duties of the several officers. The present plan of doing all literary or scientific work in general session should be abolished, and the work divided into distinct sections, presided over by officers elected annually by the general session. The formation of the program for each session should be placed definitely in the hands of one committee, with subdivisions to represent the sections so that the responsibility of this important work should be definite.

The address was referred to a special committee, consisting of Drs. J. Taft, H. W. Morgan, and James Truman, which reported at a later session recommending that the revised constitution proposed be printed in order that the members might have the opportunity to familiarize themselves with its provisions by the time of the next annual meeting.

Adjourned to 7.30 P.M.

(To be continued.)

Niagara Falls was selected as the place for the next meeting, and the following were elected officers: James E. Libbey, Pittsburg, Pa., president; S. H. Guilford, Philadelphia, Pa., vice-president for the East; L. G. Noel, Nashville, Tenn., vice-president for the South; W. P. Dickinson, Minneapolis, Minn., vice-president for the West; Josephine D. Pfeiffer, Chicago, corresponding secretary; A. H. Peck, Chicago, recording secretary; H. W. Morgan, Nashville, Tenn., treasurer; H. J. Burkhart, Batavia, N. Y., B. Holly Smith, Baltimore, Md., J. Y. Crawford, Nashville, Tenn., C. C. Chittenden, Madison, Wis., and M. F. Finley, Washington, D. C., executive council; C. S. Butler, Buffalo, N. Y., W. N. Cogan, Washington, D. C., G. V. I. Brown, Milwaukee, Wis., members of the executive committee.

NATIONAL DENTAL ASSOCIATION, SOUTHERN BRANCH.

ELECTION OF OFFICERS.

At the regular annual meeting of the National Dental Association, Southern Branch, held at Nashville, Tenn., July 29, 30, and 31, 1901, the following officers were elected: H. H. Johnson, Macon, Ga., president; L. G. Noel, Nashville, Tenn., first vice-president; G. S. Vann, Gadsden, Ala., second vice-president; Wm. G. Mason, Tampa, Fla., third vice-president; C. L. Alexander, Charlotte, N. C., corresponding secretary; S. W. Foster, Atlanta, Ga., recording secretary; B. D. Brabson, Knoxville, Tenn., treasurer. Members of the Executive Committee to serve for three years—V. E. Turner, Raleigh, N. C., and W. K. Slater, Knoxville, Tenn.

The next meeting will be held in Atlanta, Ga., February 18, 19, and 20, 1902.

NATIONAL ASSOCIATION OF DENTAL FACULTIES.

At the eighteenth annual meeting of the National Association of Dental Faculties, held in Milwaukee, August 2-6, 1901, the following officers were elected for the ensuing year: W. F. Litch, Philadelphia, Pa., president; G. V. I. Brown, Milwaukee, Wis., vice-president; J. H. Kennerly, St. Louis, Mo., secretary; H. W. Morgan, Nashville, Tenn., treasurer; S. W. Foster, Atlanta, Ga., D. J. McMillen, Kansas City, Mo., members of the executive committee for two years; J. B. Willmott, Toronto, Canada, member of executive committee for one year (John I. Hart, New York, and H. B. Tileston, Louisville, Ky., hold-over members); J. P. Gray, Nashville, Tenn., W. T. McLean, Cincinnati, Ohio, and A. H. Peck, Chicago, ad interim committee; H. W. Morgan, Nashville, Tenn., W. A. Montell, Baltimore, Md., and F. D. Weisse, New York, law committee.

Among the more important business transacted by the association was the lengthening of the college course to four years, beginning with the session of 1903-1904; and the fixing of the sum of one hundred dollars as the minimum fee for each session, to go into effect with the session of 1902-1903.

The association was addressed at some length by James H. Worman, United States consul at Munich, who told in detail some of the work which he had done in exposing the traffic in fraudulent diplomas, and showed some of the evidence which he had accumulated during the eighteen months he had been engaged in following up these cases. The greater part of the work he had done in this matter had been at his personal expense. For this he asked no return or remuneration, but he did ask that his hands be upheld in the future, and that such steps should be taken by the dental profession of America as should wipe out forever this stain upon the good name of the American people.

After Mr. Worman's address, the colleges represented in the association subscribed \$2950 to aid in the suppression of the traffic in fraudulent diplomas.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

At the annual meeting of the National Association of Dental Examiners, held at Milwaukee, August 2-6, 1901, the following were elected officers for the ensuing year: John F. Dowsley, Boston, Mass., president; Charles A. Meeker, Newark, N. J., first vice-president; J. A. Hall, Collinsville, Ala., second vice-president; Burton L. Thorpe, St. Louis, Mo., third vice-president; J. Allen Osmun, Newark, N. J., secretary-treasurer.

COLORADO STATE DENTAL ASSOCIATION.

At the annual meeting of the Colorado State Dental Association, held in the Brown Palace Hotel, Denver, July 9, 10, and 11, 1901, the following officers were elected for the ensuing year: J. Stewart Jackson, Denver, president; Theodore Ashley, Canon City, vice-president; W. A. Brierley, Denver, secretary; Wm. Smedley, Denver, treasurer.

The next annual meeting will be held in Colorado Springs during June, 1902.

W. A. BRIERLEY, *Sec'y*.

NEW JERSEY STATE DENTAL SOCIETY.

At the annual meeting of the New Jersey State Dental Society, July 18, 1901, the following officers were elected for the ensuing year: Wm. L. Fish, Newark, president; Frank L. Hindle, New Brunswick, vice-president; Chas. A. Meeker, Newark, secretary; Henry A. Hull, New Brunswick, treasurer. Executive Committee—Frank L. Hindle, New Brunswick; H. S. Sutphen, Newark; A. Irvin, Camden; W. W. Hawke, Flemington; Oscar Adelberg, Elizabeth. Membership Committee—J. A. Duffield, Camden; G. M. Holden, Hackettstown; W. H. Pruden, Paterson; T. Star Dunning, Paterson; H. P. Marshall, Newark.

C. A. MEEKER, *Sec'y*.

WISCONSIN STATE DENTAL ASSOCIATION.

THE Wisconsin State Dental Association held a short executive session at Milwaukee August 5, 1901, and adjourned to take part in the meetings of the National Dental Association. The officers elected in 1900 were, on motion, continued for the coming year, as follows: E. A. Gatterdam, La Crosse, president; E. J. Hart, Madison, first vice-president; T. Stein Reuter, Milwaukee, second vice-president; W. H. Mueller, Madison, secretary; E. L. Palmer, Janesville, treasurer.

GEORGIA STATE DENTAL SOCIETY.

THE Georgia State Dental Society at its last meeting elected the following officers for the present year: H. H. Johnson, Macon, president; A. M. Jackson, Milledgeville, first vice-president; E. A. Tigner, Milledgeville, second vice-president; O. H. McDonald, Atlanta, corresponding secretary; S. H. McKee, Americus, record-

ing secretary; H. A. Lowrance, Athens, treasurer; W. H. Weaver, LaGrange, journal editor. Executive Committee—J. C. Brewer, Chairman, Blackshear; B. H. Patterson, C. C. Campbell, B. F. Hair, H. W. Walker. Examining Board—Jno. H. Coyle, chairman, Thomasville; D. D. Atkinson, secretary, Brunswick; B. F. Sims, E. H. Reid, Thos. Cole.

The next place of meeting will be Macon, Ga., second Tuesday in June, 1902.

HARVARD DENTAL ALUMNI ASSOCIATION.

THE thirtieth annual meeting and banquet of the Harvard Dental Alumni Association was held at Boston, Mass., June 24, 1901, with one hundred and twenty-three persons present. General Curtis Guild, Jr., of Boston, editor of the *Boston Commercial Bulletin*, was the guest of the association, and spoke upon "The Duties of a Liberal Education." Twenty-three new members were added to the membership roll.

The following officers were elected for the ensuing year: Henry W. Gillett, Newport, R. I., president; Luther D. Shepard, Boston, vice-president; Waldo E. Boardman, Boston, secretary; Harry S. Parsons, Boston, treasurer. Executive Committee—Waldo E. Boardman, *ex-officio* chairman, Boston; William P. Cooke, Boston; Charles E. Perkins, Brockton.

WALDO E. BOARDMAN, *Sec'y*.

CONNECTICUT BOARD OF DENTAL COMMISSIONERS.

GOVERNOR MCLEAN, of Connecticut, on July 1st, appointed an entirely new Dental Commission to serve two years. They were—William H. Loomis, Rockville; W. E. Hyde, Danielsonville; J. Tenney Barker, Wallingford; Horace Bascom, New Haven; Edward W. Pratt, East Hartford.

On July 1st the commissioners met in the Capitol at Hartford, and elected Edward W. Pratt president, and J. Tenney Barker recorder.

The commission decided to grant no more temporary licenses to practice.

J. TENNEY BARKER, *Recorder*.

DENTAL SOCIETY ANNOUNCEMENTS.

SOUTHERN CALIFORNIA DENTAL ASSOCIATION.

THE fourth annual meeting of the Southern California Dental Association will be held in Los Angeles on October 8 and 9, 1901.

LEWIS E. FORD, *Sec'y*.

FIRST DISTRICT DENTAL SOCIETY OF ILLINOIS.

CHANGE OF DATE OF MEETING.

THE twentieth annual meeting of the First District Dental Society of Illinois will be held at Monmouth, October 1 and 2, 1901. All members are requested to note the change of date (from September 24th and 25th).

All dentists residing in the district are urged to be present. Visiting dentists from this and adjoining states will be welcome. An interesting program is in course of preparation.

F. J. KYLER, *Sec'y.*

NORTHEASTERN DENTAL ASSOCIATION.

THE seventh annual meeting of this association is to convene in Springfield, Mass., October 30, 31, and November 1, 1901. The committee promises eight original essayists of more than local reputation; forty clinics, table and chair. "Memorial Building," where the meeting is to be held, has three floors,—upper for meeting, middle for exhibitors, and lower for clinics. Certificate plan for railroad fares. Springfield is a well-located railroad center, with eight first-class hotels. All ethical dentists invited.

EDGAR O. KINSMAN, *Sec'y,*
Cambridge, Mass.

DENTAL COMMISSIONERS OF CONNECTICUT.

THE Dental Commissioners of Connecticut will meet at the Capitol in Hartford, Tuesday, Wednesday, and Thursday, November 12, 13, and 14, 1901, to examine candidates for license and attend to any business proper to come before them.

The written theoretic examination will be held Tuesday and Wednesday, November 12th and 13th. Practical examination in operative and prosthetic dentistry at 9 A.M. on Thursday, November 14th.

All persons desiring to practice dentistry in this state must apply to the Recorder for revised rules and for the proper blanks. Blanks must be carefully filled in and sworn to, and with fee, twenty-five dollars, filed with the Recorder at least one week before the day of examinations.

J. TENNEY BARKER, D.D.S.,
Dental Com'r and Recorder.

EDITORIAL.

THE EDUCATIONAL VALUE OF REPETITION.

THE fault is often found with papers read before dental societies and the discussions which follow that they bring out so few original thoughts; that too frequently they are but the repetition in other dress of ideas previously advanced. That this is necessary and to be expected Dr. Black, in his address as president before the National Dental Association, shows very neatly in the following remarks:

"In the earlier years of this organization the literary and scientific work seems to have been very satisfactory. The membership was smaller and not so many men wished to read papers or to discuss them. The interests of the members were not so varied as now. And yet, as I look back over the proceedings of past years, there seems to have been no lack of interesting mate-

rial. In such a review we will naturally find that much that has been written and much that has been said in discussion has been what I should designate 'literature of the day.' The papers that we can now look back upon and designate as milestones marking the onward progress of professional thought are not especially numerous. In the natural order of things, this could not well be otherwise. A new discovery or thought that serves as a decisive stepping-stone for advance is usually told in few words or within the compass of a comparatively short paper. But the diffusion to the general profession of a full understanding of its scientific import and its variety of application to practice requires many papers and discussions which to some of us seem trivial, to be repetitions, or in some instances mere words, and yet may and do serve to round out and complete the conveyance of the fund of information to the general profession. These are therefore among the necessities of progress. Many papers that are adapted only to the day and occasion for which they were prepared, that interest but the few, and have little or no value in the permanent literature, are really excellent productions and necessary."

REAL WAR ON THE DIPLOMA TRAFFIC.

At last it would seem that effective measures are to be taken to deal with the illegal traffic in bogus American dental degrees. Largely owing to the persistent work of Hon. James H. Worman, United States consul at Munich, Germany, the way is open for the authorities to act. That they will act seems unquestionable. Indeed, preliminary action has already been taken to clear the way for vigorous measures, as is shown in the recital below.

Of late years, legislation for the regulation of the practice of dentistry has made the acquirement of a "fake" diploma a useless expenditure in most of the states. It would not entitle the holder to practice. The narrowing of the market thus created here has caused the makers and venders of the articles to seek an outlet for their ware in foreign lands. There the reputation for skill gained by the pioneer American dentists who introduced American methods made the title "American dentist" an open sesame to lucrative practices. Unscrupulous men eagerly seized upon the opportunity to acquire the "honors" and probable emoluments of an American diploma for money without having to go through the curriculum, the years of study and labor, through which the skill of the American dentist is acquired. The prices charged have usually been high, and the fakers of dental diplomas have doubtless reaped a rich harvest. The inevitable result has been to largely discredit the American dental degrees, D.D.S. (Doctor of Dental Surgery) and D.M.D. (Doctor of Dental Medicine), in foreign countries where the situation is not understood. One effect of this is seen in the growth of the movement for the shutting out of these degrees in several European countries.

This discrimination against the holders of American degrees—degrees which, honestly acquired, are of themselves sufficient evidence of the holders' fitness to practice dentistry—has been the theme of discussion in societies and of papers in the dental magazines. The fact that so-called diplomas were being sold has been patent to every well-informed dentist. Until recently, however, no effective means for remedying this evil has been discovered. For some years back the center of the illegal traffic has been the state of Illinois. This state has within its borders some of the best of the dental colleges. It has also in its fundamental law—the state constitution—a provision whereby on the payment of a nominal sum a charter may be taken out by any three citizens for an educational institution empowered to grant dental or medical or any other degrees desired. It is not hard to guess to what uses such power may be put when vested in the hands of unscrupulous men. An example shows what use *has* been made of it. Investigation of the affairs of one institution brought to light the fact that its proprietors were in possession of twenty-four different charters, every one of which it is to be presumed was legally taken out, and to the legality of institutions operated under which the Secretary of State of Illinois would have been compelled to certify. These charters permitted these men to offer no less than thirty-six different diplomas in all the branches of science and arts.

That this provision, originally adopted for beneficent purposes and to foster legitimate business enterprise, has been vicious in its adaptation to dental education needs no further testimony than the fake dental diplomas which have been issued under its protection. Of course, the diplomas were "bogus," and would have no value in America; but the institutions which issued them were legal, and until legal evidence of the frauds which they committed was obtained little could be done to correct the evil. Wherever such evidence has been obtained, the proper action has been taken; the charters have been annulled, and in some instances at least the men operating them have been jailed.

A ramification of the scheme of late has been the securing of what purported to be the indorsement of the Illinois State Board of Dental Examiners. That is to say, purchasers of these fake diplomas were also provided, when desired, with what appear to be licenses to practice dentistry in the state of Illinois, testifying that the holders had been duly examined by the board and found competent to practice. The latest developments seem to show that forgery has been committed in the preparation of these documents,—by whom has not so far been ascertained.

A little more than a year and a half ago, Mr. Worman entered upon what may be properly called a veritable crusade against fake dental diplomas, which he found were doing incalculable injury to the American dental profession in Europe, and more especially in Southern Germany, where he was accredited. During that year and a half he has gathered together at a weary outlay of time, labor, and money a great mass of evidence. Something of the character of this evidence was shown by the publication of a portion of the correspondence of the Foreign Relations Committee of the National Association of Dental Faculties in the DENTAL COSMOS for May. This evidence is now in this country and available for the purposes for which it was gathered,—namely, making war on the diploma traffic, its aiders and abettors. It includes some original documents purporting to be properly issued certificates or licenses to practice dentistry in Illinois, and photographic copies of a large number of others.

Mr. Worman was present at the meetings of the national associations at Milwaukee in the early part of August, and addressed the National Dental Association, the National Association of Dental Faculties, and the National Association of Dental Examiners. His words, fortified as they were by indisputable evidence that frauds of the most glaring character had been committed, opened the minds of his hearers to the enormity of the offense against dental education which was being perpetrated as they had never been opened before, and the result was a pledge of hearty co-operation in the work of uprooting the traffic. The various colleges, members of the Faculties Association, subscribed \$2950 to assist in defraying the expenses, and the National Dental Association appropriated \$1000 out of its treasury for the same purpose.

Fortified by these resolutions, Mr. Worman and a number of representative dentists called upon the governor of Illinois and laid the case before him. The governor promptly asked for the resignations of the entire State Board of Dental Examiners, which were handed in and a new board was appointed, as follows: G. H. Dameron, of Arcola; J. G. Reid, of Chicago; Clark R. Rowley, of Chicago; T. W. Pritchett, of Whitehall; Don M. Gallie, of Chicago. Dr. Reid is the only member of the old board who was reappointed. The new board has organized by the election of Dr. Pritchett as president and Dr. Reid as secretary-treasurer.

Immediately after the resignations of the old board were called for, Dr. Jacob H. Smyser, the former secretary, was arrested on two warrants charging him with forgery and the issuing of forged diplomas, and gave bonds of \$3000 for his appearance. At the

hearing, August 16, three additional warrants were served, charging forgery, malfeasance in office, and accepting a bribe. Bonds were given in \$4000 and the case was continued to the 20th, when it was again continued for ten days, owing to illness in the family of the judge.

The document upon which the first charges were founded was the alleged license granted by the Illinois board to Emil Gumpoldt. It bore, in addition to Dr. Smyser's, the names of Drs. A. C. Barr and W. C. Jocelyn, former members of the board. Both Barr and Jocelyn pronounce their alleged signatures to be forgeries, and the handwriting experts employed by the authorities have decided that neither the signature of Dr. Smyser nor those of Drs. Barr and Jocelyn were written by him. Dr. Smyser claims that in every instance where his name is found on the fake papers it is a forgery.

Undoubtedly forgery has been committed on a large scale,—by whom those who are now engaged in the work will endeavor to ferret out.

Mr. Worman has been served with papers in a suit for libel with damages laid at \$50,000 by Dr. Fritz W. Huxman, president and dean of the German-American Dental College of Chicago, who charges that Mr. Worman has placed his college in the list of "fake" diploma mills, greatly damaging its reputation thereby, and that statements derogatory to his school have been published by the consul in many medical papers.

NO NEW LAW FOR CONNECTICUT.

IN the August issue of the DENTAL COSMOS there appeared a copy of what purported to be a new dental act for the state of Connecticut. Evidently the DENTAL COSMOS has been imposed upon by some enthusiast or by a faker,—just who or which cannot be determined at this moment. The draft of the law printed was submitted to the legislature, but was rejected. As a consequence, the old law of 1893 is still the basis for the regulation of practice in Connecticut.

BIBLIOGRAPHICAL.

SAJOURS' ANNUAL AND ANALYTICAL CYCLOPEDIA OF PRACTICAL MEDICINE. Vol. VI. Philadelphia, The F. A. Davis Company, 1901.

The sixth volume of this treatise on Practical Medicine has just appeared, and it is in every way worthy of being the continuation

of the previous volumes, containing articles by the foremost men in medicine and surgery. It is the last volume of the first series.

L'ÉVOLUTION DE L'ART DENTAIRE. L'ÉCOLE DENTAIRE, SON HISTOIRE, ETC.

THE EVOLUTION OF DENTAL ART. L'ÉCOLE DENTAIRE, ITS HISTORY, ITS WORK, AND ITS FUTURE. By Dr. CH. GODON, Director of the École Dentaire. Paris, J. B. Baillière et fils, 1901.

The author first reviews the evolution of dentistry through the different ages. He then shows that at all times in the civilization of the Egyptians, Greeks, Romans, and Arabs dentistry was practiced by specialists just as it is to-day. He divides dental history into two periods,—a practical and a scientific. The first begins with the most remote times and terminates at the end of the seventeenth century, while the second begins in 1727 with the publication in France of the first treatise on dentistry, "Le Chirurgien-Dentiste," by Pierre Fauchard. In this latter division the importance of the foundation of the first dental society and dental school is given full appreciation.

In the second part of his work the author has taken the École Dentaire as the type of the evolution of dentistry, and describes the history of the institution. He points out the influence which the school has exercised upon the regeneration of dental studies in France through its activities, and the development that it has brought about, and to which the position of the modern dental surgeon created by the medical act of November 30, 1892, is due.

Two synoptic tables of the program of studies—one of 1880, the other of 1900—placed at the end of the work sum up the dental progress which has been realized during the last twenty years. The conclusions formulated at the end of the book represent the present desiderata common to the dentists of all countries.

As can be seen from the foregoing analysis, Dr. Godon's work is an exceedingly interesting and instructive one, and it should occupy a distinguished place in the dental library.

BOOKS RECEIVED.

Oral Pathology and Practice. Second edition. By W. C. Barrett, M.D., D.D.S.

Oral Surgery. By Stewart LeRoy McCurdy, A.M., M.D.

Interrogations in Dental Metallurgy. By J. H. Beal, Sc.D.

(Notices of the foregoing will appear later.)

OBITUARY.

DR. M. C. McNAMARA.

DIED, June 16, 1901, at Alexian Brothers Hospital, St. Louis, M. C. McNAMARA, D.D.S., of paralysis, in his seventy-second year.

Dr. McNamara was an old resident of St. Louis, and in his prime he was one of the most successful of dentists, having at one time an income of not less than twenty thousand dollars a year.

The St. Louis Dental Society held a special meeting at Dr. Conrad's office, 3666 Olive street, on June 17, the day following that of Dr. McNamara's death. After several short addresses by various members, the following were chosen to act as pall-bearers: C. H. Manhard, Wm. Conrad, Walter M. Bartlett, John H. Kennerly, B. L. Thorpe, P. H. Eisloffel, John G. Harper, Abel J. Prosser, and A. Tschirner.

A committee was also appointed to draft a biographical sketch of the deceased. They subsequently made the following report:

"Dr. M. C. McNamara was born in 1829, in Ontario, Canada, of Irish parentage. He engaged in mercantile pursuits in that province in his earlier years, and there married Miss Katharine Aquesta Martin, fourth daughter of William Francis Martin, a civil engineer in the employ of the British government. He was also a member of council in London, Ontario. Dr. McNamara in 1863 removed to Philadelphia, and a year later came to St. Louis.

"Soon after his arrival here Dr. McNamara was graduated from the old St. Louis Dental College, and began the practice of dentistry. Later he occupied a chair in the college. In 1896 he lost his wife, and from that time took little part in active business. He was a member of the Knights of St. Patrick, and of a number of charitable and Catholic religious organizations. He was a former president of the St. Louis Dental Society, a member of the Odontological Society of St. Louis, and Missouri State Dental Association.

"Dr. McNamara had a family of seven sons and two daughters. The survivors are four sons—Joseph T., John J., William F., and Edward J., and two daughters, Miss Frances K. McNamara and Mrs. F. L. Linton.

"He was an all-round dentist and took great pride in making his operations as nearly perfect as possible. He was ethical in every sense of the word. For a number of years he insisted on entertaining the St. Louis Dental Society at its annual meetings for the election of officers. These meetings were held at his spacious residence; after the business of the session was disposed of an elegant repast was partaken of in the dining-room.

"Personally, Dr. McNamara was a fine specimen of an Irish gentleman, and generous to a fault.

"Having been long connected with the Jesuit Church, at Ninth street and Washington avenue, by special permit he was buried from St. Francis Xavier Church, Grand and Lindell boulevard, Rev. Father Daniel McErlane, S.J., officiating, and was interred in Calvary Cemetery on Tuesday, June 18, 1901.

"JOHN G. HARPER,
WILLIAM N. CONRAD,
ADAM FLICKENGER, *Committee.*"

DR. H. G. HALL.

DIED, May 23, 1901, at his residence, in Piqua, Ohio, Dr. HORATIO GATES HALL, aged seventy-one years, the cause of death being Bright's disease.

Dr. Hall was one of the best-known dentists in western Ohio. He had been actively engaged in the practice of dentistry for forty-six years. He

was an honorable and genial Christian gentleman, one whose acquaintance and friendship was well worth seeking. He leaves a wife, two daughters, and two sons. He is the first of four brothers, all dentists, to be claimed by death. He will be greatly missed.

DR. JAS. LEWIS.

DIED, at his home in Burlington, Vt., June 8, 1901, from neuralgia of the heart, JAMES LEWIS, D.D.S., in the eighty-first year of his age.

Dr. Lewis, at the time he retired from practice, about two years ago, was the oldest dentist in Vermont, having practiced in Burlington for fifty-nine years. He was a graduate of the University of Vermont, of the Pennsylvania College of Dental Surgery, from which he received the degree of D.D.S. in 1897, and had taken a special course in anatomy at the Jefferson Medical College, Philadelphia.

Dr. Lewis was a man of strong personality and of strict business integrity, while his long professional service made him well known throughout the state.

Two sons survive him, both of whom are physicians.

DR. M. LOUIS RHEIN, SR.

DIED, July 19, 1901, in New York city, from pneumonia, Dr. M. LOUIS RHEIN, in the seventy-fourth year of his age.

Dr. Rhein, who retired from active practice several years ago, was born June 2, 1828, at Schwetzingen, Germany. He was educated at Heidelberg, studying medicine at the university. For some time he was engaged as a jeweler, thus acquiring a facility in the use of tools and a knowledge in the treatment of metals which was of special use to him in prosthetic dentistry. Entering dental practice when many dentists were in the habit of carving their own porcelain teeth, he acquired special skill in this work, and was one of the first to make continuous-gum sets.

Coming to America in 1848, Dr. Rhein began practice in St. Louis, afterward moving to Albany, N. Y., which was his permanent home for many years. He was a man who held his professional services to be worthy of a price commensurate with his scientific knowledge and his high manual skill, and was always unwilling to compete in price with those who would debase their calling by inferior work. The standard of ethics as related to his profession he held sacred, always strictly observing the code himself and exacting its observance from others. Having had the advantage of a medical education, he held that a dentist could not be properly equipped without it.

Dr. Rhein leaves a wife and three sons, the eldest of whom, Dr. B. L. Rhein, is practicing dentistry in London; the second, Dr. M. L. Rhein, is the well-known New York dentist; while the youngest at present holds a civil position as secretary of Pasig, Philippine Islands.

DR. ZACHARY T. SAILER.

DIED, June 16, 1901, at his home in New York city, ZACHARY T. SAILER, D.D.S., aged fifty-five years.

Dr. Sailer was born at Mount Holly, N. J., where his boyhood and early manhood were spent. He passed a number of years in the service of the

Camden and Amboy Railroad, and then moved to New York city and took up the study of dentistry, graduating from the New York College of Dentistry with the class of 1879.

In continuous practice in New York ever since he graduated, Dr. Sailer became prominent among his fellow-practitioners by his advocacy of certain methods which seemed to be going out of use in the hands of the more progressive men. He was always an ardent advocate of soft gold for fillings, and condemned the use of the rubber dam in ordinary operations. He invented a number of devices and improvements in dental implements.

In association work Dr. Sailer was ever active, being a member of the Stomatological Institute, the New York Odontological Society, and the Alumni Association of the New York College of Dentistry, of which he was for many years the treasurer. He was a frequent and welcome visitor at the Central Dental Society of Northern New Jersey, and will be greatly missed at its meetings. He was also a member of the Colonial Club, and a Past Master of Manhattan Lodge, No. 62, F. and A. M.

Dr. Sailer married, in 1885, Miss Rose Duffy, of New York, who with one daughter survives him.

DENTAL LEGISLATION.

DENTAL LAW OF SOUTH DAKOTA.

PASSED BY THE LEGISLATURE OF 1901, BEING HOUSE BILL 204. RELATING
TO THE PRACTICE OF DENTISTRY.

AN ACT TO INSURE THE BETTER EDUCATION OF PRACTITIONERS OF DENTAL SURGERY, AND TO REGULATE THE PRACTICE OF DENTISTRY IN THE STATE OF SOUTH DAKOTA.

Be it Enacted by the Legislature of the State of South Dakota:

SECTION 1. *Who may practice—License.* It shall not be lawful for any person to practice dentistry in this state without having a license so to do from the Board of Dental Examiners.

SEC. 2. *Board—How constituted.* The State Board of Dental Examiners consisting of five members heretofore created, shall continue to be the State Board of Dental Examiners. Upon the expiration of each member's term of office the Governor shall appoint his successor, who shall hold office for five years and until his successor is appointed and qualified. All vacancies in such board shall be filled by appointment by the Governor. All appointments shall be made from names furnished by the South Dakota State Dental Society, and it shall be the duty of the said South Dakota State Dental Society to present the Governor with twice the number of names as there are appointments to be made. No person shall be eligible to appointment on such board who is not a practicing dentist in this state.

SEC. 3. *Power to make rules—Officers—Records.* Such board shall have power to make reasonable rules and regulations for carrying into effect the provisions of this act. It shall choose one of its members president and one secretary thereof, and shall hold regular meetings twice in each year, and such special meetings as the board may by its rules provide. A majority of the members of the board shall constitute a quorum for the transaction of business, but a less number may adjourn from time to time. The board shall keep full and complete minutes of its proceedings and of its receipts and disbursements, and a full and accurate list of all persons licensed and registered by it; and such records, together with the list of licensed and registered dentists, shall be public records, and shall at all reasonable times be open to public inspection. Such records, or a tran-

script of the same, or any part thereof, under the seal of the board, certified by the secretary thereof, shall be competent evidence of the facts therein stated. A certificate of the secretary, under seal of the board, stating that any person is or is not a registered dentist shall be *primâ facie* evidence of such fact. The president and secretary of the board shall have authority to administer oaths, and the board shall have power to hear testimony as to all matters relating to the duties imposed upon it by law. If any member of the board shall, without cause, absent himself from two of its regular meetings consecutively, his office shall be deemed vacant, and such vacancy shall be filled by appointment as hereinbefore provided.

SEC. 4. *Certificate of registration—Fee.* It shall be the duty of each person licensed by the board to practice dentistry in this state to procure from the secretary of the board, on or before July 1st annually, a certificate of registration. Such certificate shall be issued by the secretary upon the payment of a fee to be fixed by the board, not exceeding the sum of two dollars. All certificates so issued shall be *primâ facie* evidence of the right of the holder to practice dentistry in this state during the time for which they were issued. Any certificate or license granted by the board may be revoked by it upon conviction of the party holding it of a violation of any of the provisions of this act. Every person receiving such certificate shall conspicuously expose the same in his place of business.

SEC. 5. *Examination and qualification of practitioners.* Any person desiring to begin the practice of dentistry in this state must, in order to be eligible for examination, furnish to the board satisfactory evidence that he has been engaged in the active practice of dentistry for at least three years immediately preceding such examination, or that he has pursued the study of dentistry in the office or under the supervision of a regular practicing dentist for such a period. He shall be examined by the board with reference to his knowledge and skill in dentistry, and if upon such examination such person is found in the judgment of the state board to possess suitable qualifications to practice dentistry, and if the board is satisfied that the applicant has a good moral character, it shall issue to such applicant a license to practice dentistry in accordance with the provisions of this act; *provided*, that any person desiring to commence the practice of dentistry in this state and having a diploma issued by a reputable dental college or dental department at any university shall, in person, present the same to the State Board of Examiners, and the board, being satisfied as to the genuineness of the diploma, may, without examination, issue a license to such person to practice dentistry in this state on payment of the license fee hereinafter provided for. All licenses issued by the board shall be signed by the several members thereof, and be attested by its president and secretary under the seal of the board.

SEC. 6. *Who regarded as practicing dentistry.* A person shall be deemed to be practicing dentistry within the meaning of this act who shall perform operations or parts of operations of any kind, or treat diseases or lesions of the human tooth or jaw, or correct malposition thereof. But nothing in this article contained shall be so construed as to apply to acts of *bona fide* students of dentistry done in the pursuit of clinical advantages under the direct supervision of a preceptor or a licensed dentist in this state during the period of their enrollment in a dental college and attendance upon a regular course in such college, or to prevent any legally qualified resident physician and surgeon from extracting teeth, or to prevent any person from using any domestic remedy or other means for the relief of pain.

SEC. 7. *Fee for examination—Annual reports, etc.* The Board of Dental Examiners may require each person applying to it for examination to pay a fee not exceeding ten dollars, which shall in no case be returned.

If the applicant shall receive a license to practice he shall thereupon pay the further sum of five dollars, which shall also entitle him to receive a certificate of registration for the current or registration year in which such license is issued. Thereafter he shall annually obtain a certificate as hereinbefore provided. Out of the funds received by the board each member may be paid the sum of five dollars for each day actually engaged in the duties of his office and all legitimate and necessary expenses incurred

in attending the meetings of said board. Such expenses shall be paid from the fees received by the board under the provisions of this act, and no part of the salary or other expenses of the board, excepting the printing of the annual report, shall be paid out of the state treasury. All moneys remaining after the payment of such per diem allowance and other legitimate and necessary expenses, as above provided for, shall be held by the secretary as a special fund for defraying the expenses of the board in carrying out the provisions of this act. The secretary shall give a bond in such sum and with such conditions as the board may from time to time direct. The board shall make an annual report of its proceedings to the Governor on or before the fifteenth day of November in each year, which report shall contain an account of all moneys received and disbursed by the board during the preceding year.

SEC. 8. *Temporary certificate.* Any two members of said board may issue a temporary certificate to any applicant upon the presentation by such applicant of the evidence of the necessary qualifications to practice dentistry, and such temporary certificate shall remain in force until the next regular meeting of said board occurring after the date of such temporary certificate, and no longer. But one temporary certificate shall ever be issued to the same applicant.

SEC. 9. *Penalty for violation of this act.* Any person violating any of the provisions of this act is guilty of a misdemeanor, and upon conviction thereof is punishable by a fine not exceeding three hundred dollars, or by imprisonment in the county jail not exceeding sixty days, or by both.

SEC. 10. *Penalty for false pretense.* Any person who shall knowingly or falsely claim or pretend to have or hold a certificate of registration, diploma, or decree granted by a society or by the Board of Dental Examiners, or who shall falsely or with intent to deceive the public claim or pretend to be a graduate from any dental college, not being such graduate, is guilty of a misdemeanor, and upon conviction is punishable as provided in Section 9.

SEC. 11. *Penalty for practicing under false name, etc.* Any person who shall be licensed under the provisions of this article, and who shall practice dentistry under a false name with intent to deceive, shall be liable to have his license revoked upon twenty days' notice of such proposed revocation and of the time and place of considering such revocation by the State Board of Dental Examiners. Any person who, after the revocation of his license, continues to practice dentistry in this state is guilty of a misdemeanor, and upon conviction thereof is punishable as provided in Section 9.

SEC. 12. *Repeal.* All acts and parts of acts in conflict with the provisions of this act are hereby repealed.

Approved March 7, 1901.

PERISCOPE.

THE TEACHING OF MECHANICAL DENTISTRY IN DENTAL SCHOOLS.—The value of a thorough mechanical training is universally acknowledged to be of first importance in the practical education of the dental student. The reasons for this are not far to seek, and seem to focus themselves naturally into two considerations. First, the dental surgeon in his work needs the continuous exercise of manual dexterity, perhaps to a larger degree than in any other branch of surgery; his hand and eye must work together intelligently and effectively, often under conditions which demand almost microscopic exactitude, and involve a nervous stress trying to both hand and brain. A thorough training in dental mechanics, upon lines which familiarize the student with the anatomy of the mouth, and which, while exact and minute, can be accomplished under more or less comfortable physical conditions and without nervous strain, is calculated to be the best possible education for future surgical manipulation in the mouth itself. Second, the mechanical training is in itself a distinct and essential portion of dental education, having

a very direct bearing upon an important part of the every-day work of the dentist.

Every one of experience grasps the situation by admitting the necessities of the case. Even the College of Surgeons, wrapped in its cerements of respectable conservatism, is awakening to its duties in the matter; the student alone rubs his eyes, and asks if it be a dream. But we want to open his eyes also, and persuade him that his early years are to be devoted to making a "handy man" of him.

Before entering upon the subject proper which we are here to discuss to-day, I may possibly be excused if I linger for a moment to refer to a question which exercises some of us not a little: *Where* shall the dental student receive his mechanical training? But a short while ago there was no necessity for the question,—he had no alternative; he must be taught in the private workroom of the registered practitioner. Now it is otherwise, and the powers that be have made it possible for the student to receive his training in the mechanical department of any recognized dental school. Under the altered conditions it may not be unprofitable to ask, Which is the better plan?

I suppose that on this point there must be a sharp division of opinion, just as there was when private medical pupilage ceased to exist. With our present limited experience of class teaching it would be unwise to be too dogmatic; the future will certainly throw much light on what is now more or less obscure. Mechanical dentistry is not only a science but an art, and in my experience is an extremely difficult subject to teach to the average student. Probably, the purely artistic side of the subject is the one which is so peculiarly difficult to instill into the mind of the pupil, and the personal equation involving the individuality of the teacher appears to me to swallow up all else in importance. For this reason, without entering at length into a problem which has distinct interest, I cannot help feeling that, given a *good teacher*, it must be of inestimable advantage for a student to be under the more pervading personal influence which can be felt in a private workroom to a much larger extent than is possible in a class-room where, perforce, many teachers are employed. How many of our best artists have drawn their inspiration from the personal influence of one great master! Not only is the practical influence of the private workroom likely to soak into the pupil, but the discipline of constant attendance for regular hours, which, at least in some workrooms, is rigidly enforced, cultivates, not only business habits, but a spirit of earnestness in work which it is difficult to overestimate.

I am well aware that to all this it may be retorted that in a large proportion of cases the conditions sketched do not obtain, and that the mechanical pupilage is a jumble of inefficient teaching and laxity of discipline, the only constant factor being the premium paid; the mechanic is the instructor, who may or may not be able or willing to teach, and the science pervading the private curriculum is "rule of thumb" and the particular *modus operandi* of the workroom. If this be true, more shame to the practitioner, who pockets the fees while forgetting his obligation of providing *efficient teaching* in a *properly equipped* workroom!

Whatever theories be propounded as to the value of private pupilage, one fact stares us in the face,—viz, that the average student, as he enters hospital, is deficient in both the science and art of dental mechanics; on the other hand, it is interesting to note that the exceptions—those who come with trained hands and eyes—almost invariably turn out to be good operators and good students, for the very reason that they have already tasted of the discipline and enthusiasm of studentship during their mechanical career. As you are aware, the six practical dentures which the student has to make and adjust in the mouth during his hospital career, in addition to the crowns which he is compelled to manufacture, help the average man somewhat; so that by dint of a little extra practice which he does on his own account in the hospital laboratory, or the special class instruction which he sometimes obtains from an outside source, he somehow manages to get through his practical examination for the L.D.S. All this may possibly be corrected in the near future by the fact that the new regulations for the license provide for a

separate mechanical examination which the student takes early in his hospital career, and if this be made thorough, as I trust it will, embracing theory as well as practice, then the faulty conditions of mechanical training will rapidly become reformed, and the "happy days of yore"—when laxity of discipline and superficial teaching made up the "good time" of the mechanical pupil—will be but a forgotten nightmare.

The alternative to private pupilage is teaching in the mechanical department of a dental school, and this I intend referring to more particularly later on; but it would be well, at this point, just to bear in mind the *possibility* that in the future the circumstances of dental education and the trend of educators may determine the compulsory training of the student in every department of his work in a dental school. I do not stop to inquire whether this would be an improvement, neither do I hazard any personal opinion in the matter—probably the question is not yet ripe enough for fruitful discussion. But I do say that our hospital authorities should keep their eyes open and be prepared for an eventuality which may develop more rapidly than we suppose.

I cannot help feeling that between the two methods of mechanical pupilage there may be a *via media* which might be productive of good, and that is a *compulsory hospital course* of say six or twelve months, which supplemented the balance of the pupilage period with the private practitioner. I throw this out as a suggestion merely, but I am bound to say that I think a good deal might be urged in its favor; and if the greater reform should loom up large in the not distant future the scheme might be a preparation for the fuller sphere of work.

I could waste a good deal of your time in theories and speculations on some of the points touched upon, but I pass on rapidly to the real subject before us. We already have mechanical pupils in our dental hospitals; how shall we teach and train them most effectively?

At the outset I should like to place special emphasis on the necessity of limiting the number of pupils by the standard of *efficient accommodation* which can be provided for them. Old-fashioned ideas as to relegating mechanical work to any out-of-the-way room, cellar, or garret, must at once be put on one side. Modern teaching, even of dental mechanics, demands that the student should have abundance of light and air; and proper accommodation for a school of, say one hundred students, is a much larger affair than possibly most of us have imagined. If a proportion only of the students become full pupils, and the rest are required to do mechanical work occasionally, as part of their hospital curriculum, then the former should, in my opinion, be provided with special facilities for work, including class-rooms for demonstration purposes, and this work should, as far as possible, be removed from the turmoil which appears to be inseparable from the ordinary hospital routine. In the next place I would urge *efficient equipment*. I do not mean the particular tools required by the individual student,—that is a detail to be settled by the school, nor do I think this a suitable time to discuss the propriety of requiring every student to provide himself with everything he requires, from lathe chucks to a vulcanizer, as is usual in most of the American schools, but I mean equipment in a larger sense, in a sense which specifically applies to the education of the whole; in other words, the apparatus for teaching, not only in itself, but in its adaptability to the needs of the pupil. But the equipment cannot be determined until the educational range has been settled, and this brings us to a question which appears to have exercised the minds of some of us not a little. How far is extraneous manual training advantageous to the mechanical pupil? I have already stated the importance of hand training, indeed it cannot be too much insisted on that deft fingers co-ordinated to an accurate eye are of inestimable value to the dentist, and I may add, to his patient also. But we must remember that two short years (for the third, if it overlap with the first year of operative work, counts for little) are barely sufficient to give a man more than an elementary knowledge of such a subject as dental mechanics, and that to employ him in much extraneous work may mean crippling his special work. I do not doubt that any digital accomplishment—even thimble-rigging—may help a man in other and unallied forms of manual dexterity. To be able to draw and paint must

help to make mechanical dentistry not only easier but more interesting, but I have not yet heard the suggestion that we should send our pupils for a portion of their time to the Royal Academy schools. To the gentlemen who feel strongly that some form of hand training outside dentistry is absolutely essential, I would mention a course of work at a practical jeweler's as being a more sensible suggestion than some I have heard. I hold that a thorough course of dental mechanics is, in itself, a very perfect form of hand training, and that there are subsidiary elements which demand a considerable variety of hand-work. As an instance I would mention steel forging and tempering, which, while not dental, is very closely connected with our work. Every pupil should be well acquainted with such a subject, for the reason that it will haunt him in a very practical way right through his career. A little less directly, but still very practically, he will be benefited by a fair amount of lathe work in metal and wood; while brass fitting is, I suppose, a very natural and useful form of extraneous work even in a private workroom. I have no objection to a carpenter's bench in a laboratory, for little things, such as patterns for special castings, crop up now and then, but I venture to think that a long period spent in making dovetailed boxes, or even in carving conventional wood panels, is, however agreeable, somewhat difficult to spare from a short curriculum. Clay modeling is also another adjunct which has been suggested, and I have no doubt that a good modeler is likely to bring considerable artistic feeling into his work, but there are opportunities for modeling in wax and plaster which are an integral portion of dental work, and proper training in these branches, is, I hold, quite as good manual training as the handling of clay, while it has the advantage of being decidedly more practical. I submit, with much deference to those who differ from me, that there is amply sufficient material in purely dental work for the cultivation of manual dexterity, if the student be thoroughly taught and made to realize the importance of his early career. But few men are born artists; the average student as he comes to us is but little imbued with enthusiasm for art in any shape; he often thinks that the mechanical pupilage is a long period of martyrdom, which he must get through as best he can, which is of little moment and less utility. The student of genius is not the man we have to provide for; he will probably get on, even under unfavorable conditions and in spite of deficient teaching; but his less favored brother needs particular care; if we cannot make him brilliant, we can at least try and inculcate habits of neatness and exactness; we can try, at the very start of his career, to impress upon him the privilege of being a student, and build up gradually a desire to acquire an interest in his work for its own sake. You say this is difficult, and you speak truly. But it is not impossible. It will rest absolutely upon the influence of his school upon him. This will be of a twofold nature; the spirit of the school itself in its various manifestations of true earnestness cannot but affect him, and besides this there will be the direct personal influence of his teachers.

And this brings me to a very important part of the subject: how is the teaching staff to be made up? Dental mechanics as a subject has within the last few years (whether wisely or not I will not stop to consider) become divisible into three branches. Our American brethren are, perhaps, responsible for this, and they have devised distinguishing terms which, for the immediate purpose in hand, are at least convenient. We have, then (a) prosthetics, (b) orthodontia, and (c) crown- and bridge-work. It is true that the two latter divisions have been absorbed into practical dental surgery; and I think you will find that in this country crown-work is taught by the demonstrators of operative dentistry, while the subject of orthodontia is not only treated of in lectures on dental surgery, but also finds its way into text-books on the same subject. It may be that soon prosthetics also may follow suit—we shall then cease to worry ourselves about the teaching of dental mechanics, for the whole question will be covered in the lecture theater and the demonstrator's class-room, with possibly full directions in our text-books on dental surgery. Meanwhile the three branches require teaching, somehow, and no mechanical department of a dental school would be worthy of the name that delegated its duty to others. Shall the three parts of the subject be taught by one man or by three? Possibly the size of

the school might be a determining factor in many cases, for if we had schools of five hundred or six hundred students, as sometimes occurs in the United States, it would manifestly be impossible for the chair to be held by one man. Another interesting question which opens up is whether these subjects should be taught clinically by the visiting surgeons, or whether there should be distinctive teaching in each branch by one man who is responsible for his particular subject. In the school to which I have the honor of being attached, we have seventeen surgeons, each one of whom may have distinctive ideas of how a denture, a regulation case, or a crown ought to be constructed, so that the student cannot plead that variety of teaching is denied him. Whatever may be said against the system, it appears to have some merit,—more especially as applied to operative work,—but I am not quite sure that for dental mechanics the teaching might not be more systematized if the number of clinical teachers were reduced. Are lectures on such a practical subject as dental mechanics serviceable to the students? I have not quite made up my mind on the point; I can only assure you that the subject is a very difficult one to present with any satisfaction to the lecturer or profit to the student. Effective lecturing requires three qualities which are rare in themselves and still rarer in combination,—viz, a wide grasp of the subject, whatever it may be, clear thinking, and lucid expression; and this is a combination which we may despair of finding. But under present conditions, when students come to the hospital with but little knowledge of the scientific principles which underlie their work, it is absolutely essential that some effort should be made to present the subject of dental mechanics in its theoretical aspect. During a recent visit to the Johns Hopkins University, which has one of the best medical schools in the world, I was interested in noting that lectures had been almost entirely done away with, clinical teaching and demonstrations taking their place. In dealing with mechanical pupils at our schools, this is the system which I think would produce the best results. An efficient staff of qualified demonstrators would have to be employed, and the subject of each class might first of all be thoroughly explained, then demonstrated, and finally carried out by each member of the class under the supervision of the demonstrator. This applies, of course, to practice work in the early portion of pupilage, but to be satisfied with this is not sufficient—the principles already grasped must be carried out under more practical conditions. In other words, the pupil does not learn his work properly unless he can be brought into contact with the living structures which hitherto have been represented by plaster dummies. He must be brought to the chair side and see the work through himself from impression to fitted denture. With regard to the details of graded work required, I do not propose to discuss the question, but I would throw out the suggestion that much mutual help might be given and the cause of education advanced if the teachers of our schools in Great Britain were to meet and discuss a syllabus of instruction.

How long shall the pupil spend in the school laboratory? He is only obliged to spend two years, but we all know that the three years which are sometimes devoted entirely to the workroom are after all barely sufficient to enable the student to obtain a good grasp of his work.

I would urge that the early work of the pupil should be carefully taught and superintended, and that special care should be taken in teaching plaster work. If you have examined carefully the plaster modeling on view in the museum of mechanical work you will find a defect which is pretty general, and the more remarkable because the exhibits have been specially prepared: there is a want of neatness and symmetry which, if present under these conditions, must be very prevalent in the ordinary routine of laboratory work. I hold the opinion, which some of you may be tempted to call extreme, that an unsymmetrical model is often responsible not only for an inartistic result but often for a faulty mechanical one also. Give your student plenty of manipulation in plaster, wax, composition, and the materials to hand in the workroom. If you want to cultivate artistic feeling there are plenty of methods for doing so. As an example, I hold that a plaster mask of the face of a patient being treated for regulation of the teeth, if compared with neatly carved plaster models of the mouth, will teach the student not only to use his hands, but to be observant and artistic.

There must be a certain amount of dummy, or *technic* work, as our American brethren call it, but this wants watching carefully, lest it degenerate into the dead mechanism of impractical work, faulty in design, and impossible for practical purposes. If I may offer our friends across the water a criticism which, if inaccurate, is at least honest, I would say that their training in dental mechanics fails in the pushing of impossible technic work, which if the student carries out afterward in his practice will be found to be totally inadequate. This, together with the danger of a totally inefficient period of study,—the whole course, medical, operative, and mechanical only occupying three terms of seven months each,—accounts for what I venture to call the pronounced disparity between the operative and mechanical results of American teaching. I mention this, not in the tone of carping criticism, but as a warning to ourselves, lest in any future scheme we may devise the ultimate goal of dental education be lost,—viz, the making of a good, practical, all-round dentist.

I will only add, in conclusion, that I have but briefly touched upon some of the points which I deemed to be worthy of your consideration; I have suggested, I hope, subjects which may provoke discussion, and my earnest desire is that the teaching of dental mechanics may be recognized by the members of this association as a very important factor in the training of the dental student.—*Read at the annual meeting of the British Dental Association at Leeds, by E. Lloyd Williams, L.R.C.P. London, M.R.C.S., L.D.S. Eng.*

A DEATH FROM NITROUS OXID GAS ANESTHESIA.—The following case was reported to the Louisville Surgical Society by Thomas C. Evans, M.D., Professor of Ophthalmology, Otology, and Laryngology in the Kentucky University, Medical Department, Louisville, Ky.:

"I wish to report a death occurring from nitrous oxid gas anesthesia. The patient was a child of five years of age, a female, who was brought to see me on June 12, 1900, and operated on June 17.

"The day the child was brought to me for operation, which was the removal of some large adenoid growths from the naso-pharynx, was the second time I had ever seen it. The first time it was brought to me it apparently had a little inflammation of the faucial tonsils, and gave the history of having had the measles thirty days before I saw it. The child was rather badly nourished, was a decided mouth-breather, with quite a considerable discharge from the nose, and when first brought to me I advised that the operation be delayed for a few days.

"When finally brought back for the operation I explained to the father that nitrous oxid was probably the safest anesthetic that the child could take; that it was much less dangerous than chloroform; that it could be given with perfect safety at the office; that it would be much less troublesome and less dangerous than the administration of chloroform. The child was brought to me on Sunday, when the father could best come with it. I explained that the operation could be done with or without an anesthetic, and asked the father to make the choice. He said that I was the doctor, and whatever I said in the matter would be what he would do. I replied then that we would go ahead and give nitrous oxid gas.

"The child was taken into the office of Dr. Grant, the dentist, in the same building with me, placed in an ordinary dentist's chair, and prepared for the operation. Dr. Grant, being in the habit of giving gas, was to be the anesthetist. The child appeared a little frightened, but not the least panicky. It cried slightly. As soon as the administration of gas had been commenced, almost from the first inhalation, the expression of the child's face did not denote any fear, and in a second or two the gag fell out of its mouth.

"I will say in regard to the administration of nitrous oxid gas that we have to use a mouth-gag if we are going to do any operation about the mouth, because after the patient gets under the influence of the gas there is a spasm of the masseter muscles which makes it impossible to get the mouth open sufficiently to permit any operative manipulation. In this case I used the ordinary O'Dwyer gag, and after two or three inhalations the gag became loosened and dropped out of the mouth. The anesthetic was stopped and the

gag replaced. The child at that time was semi-conscious, not at all cyanotic, and after two or three inhalations, after replacing the mouth-gag, Dr. Grant said to me that the child was ready for the operation. I was simply going to do a curettage of the naso-pharynx.

"The first pass I made with the curette I discovered that there was absolutely no hemorrhage, and I now believe that the child was dead at that time. I abandoned the operation at once, and had Dr. Grant take the child by its heels and hold it up, and I began artificial respiration. Only ninety seconds had elapsed between the first inhalation of nitrous oxid gas and the time the child was apparently dead and was being suspended and artificial respiration practiced.

"In order to be certain that there was no obstruction in the larynx I passed my finger completely into the chink; finding there was no resistance my finger was passed between the vocal cords into the trachea, which was perfectly relaxed at that time. After performing artificial respiration the child gasped once or twice, but no pulsation appeared at any time, either at the wrist or in the carotids, nor could we discover any heart-beat. Our efforts at resuscitation were prolonged for three-quarters of an hour; we had already prepared some nitroglycerin, strychnin, and also a 100-gallon can of oxygen; we tried by artificial respiration, inflation, and other means to get oxygen into the lungs and restore the child in this way, but there never was the least attempt on the part of the heart toward performing its functions. The pupils were widely dilated.

"I have not read any detailed reports of death from the administration of nitrous oxid gas, and consequently do not know the method of death, except that in this case I believe it was due to cardiac paralysis. I also believe that this child had diphtheria following the attack of measles and that this may account for the cardiac paralysis which followed so soon after the first administration of gas. The amount of gas used in this case was about one-third the quantity it usually takes to produce sufficient anesthesia for such an operation,—viz, about three and a half gallons. During an ordinary administration of gas eight or ten gallons are given. In this case I am satisfied that not over one-third of this quantity was given before the child died."

In the discussion upon the report, Dr. J. G. Sherrill said: "I was in my office adjoining Dr. Evans's, and knew that he was going to operate upon this patient. I heard the child cry once or twice, then the cries ceased. It could not have been more than two minutes until I was called, at which time the child was suspended and Dr. Evans was performing artificial respiration. After I reached the operating room the child made two gasps like respiratory efforts; after that there appeared to be no attempt at respiration, nor was there any evidence of heart-action. I agree with Dr. Evans that the child died from cardiac paralysis—not from respiratory paralysis, and not from asphyxiation. If the trouble had been asphyxiation the child could not have died so quickly, and had this been the condition I believe the child could have been resuscitated by the means which were employed. In asphyxiation we can restore the function of breathing unless there is paralysis of the respiratory center. I believe that the child had an attack of diphtheria, and that this was a case of diphtheritic cardiac paralysis."

Dr. James B. Bullitt said: "I think the child had a weak heart resulting from diphtheria, and from Dr. Evans's admirable description of the accident it must have been that the child's heart stopped beating before the operation was really begun."—*Pediatrics*.

HOW TO PREVENT SILK LIGATURES OR RUBBER BANDS FROM SLIPPING.—Adapt to the crown a section of thin rubber tubing narrower than the tooth. It is not necessary that this covering should be ligated, but if the tooth is very conical the tube would have a tendency to shift toward the cervical border. In order to prevent this the tube is closed at its lower end by means of a silk stitch. As can be readily seen, when the silk ligatures or rubber bands are applied over this covering they will remain in position, the roughness of the rubber sheet preventing them from slipping. With this device it is possible to ligate a tooth at any point of the crown.
—*Exchange*.

A CASE OF INCOMPATIBILITY.—Sodium dioxid should not be used in conjunction with oil of cassia, for, as Dr. H. W. Wiltberger states in the *Items of Interest*, a most beautiful display of pyrotechnics follows the combination of these two substances.

HOW TO HARDEN PLASTER CASTS.—According to the *Scientific American*, plaster models can be made so hard that they will bear the driving of a nail into them without cracking by immersing them in a hot solution of glue. The model should be allowed to remain in the solution until it is completely saturated.

POLISHING ALUMINUM PLATES.—It is a very difficult matter to obtain a satisfactory finish to an aluminum plate. No matter what means are used in polishing, there is always a dull lead color, so unlike the bright appearance of this useful metal in its pure state. This can be overcome after final polish has been given with brush-wheels, etc., by coating the plate with a strong solution of caustic soda. Use a pledget of cotton on pliers dipped into the solution, coating the metal freely on both sides, allowing it to remain two or three minutes, then wash thoroughly with soap and water. If there still be dark spots, apply again to those places until they disappear. The solution will not affect the rubber attachments and will enhance the appearance of the finished plate fifty per cent.—H. F. NAUMANN, in *Items of Interest*.

MUMMIFYING PASTE.—Dr. Harry C. Webb states in *Items of Interest* that the following mummifying paste has given him satisfactory results:

R—Thymol,
Dried alum,
Glycerin, āā. 5ij;
Zinc oxid, to make a paste.

On exposure to air the paste becomes hard, so that care should be used to keep it well corked.

GELATIN IN LOCAL ANESTHESIA.—Dr. Fritz Hartwig, of Vienna, in *Wiener Zahnärztliche Monatsschrift*, states that local anesthesia is not used to-day so much as in previous years on account of the many and sometimes fatal accidents that have followed the use of local agents. Referring to cocain, he says that while it occupies a very important place in the list of local anesthetics its use has been abandoned by many practitioners on account of its toxic properties and of the ill effects following its administration. In the May, 1899, issue of the same journal Dr. Hartwig referred to the following formula by Dr. A. Lagran, for which was claimed not only anesthetic but also hemostatic properties:

R—Gelatini puri, 2.00 gm.;
Natrii chlorat., 0.70 gm.;
Acid. carb. cryst., 0.10 gm.;
Eucain hydrochlor. B, 0.10 gm.;
Cocain hydrochlor., 0.30 gm.;
Aquæ dest., ad 100.00 gm.

This solution remains unchanged even after long standing. Before every injection it has to be warmed at a temperature ranging between 20° and 25° C., as the solution solidifies at room temperature. Altogether, one hundred extractions were performed under the influence of this solution. The injections were performed according to the technique of infiltration anesthesia, injecting deeply into the tissues, and if possible at the four sides of the tooth, one c.c. of this solution. The extractions were performed immediately after the injections. The anesthesia was always perfect and more successful than with two or three per cent. solutions of cocain, and lasted from fifteen to twenty minutes. In a great majority of cases a thrombus closed the wound and never any bleeding occurred, just as claimed by Lagran. Only under unfavorable conditions did bleeding take place, and then it was quickly and successfully arrested.

The use of this local anesthetic would be advisable, according to the author, in cases of fracture of the jaw bones and in difficult extraction of roots.

Unfortunately, this admirable anesthetic produced in the majority of cases, painful after-effects and infiltration of the tissues of the wound (edema). This naturally is a very painful condition, and in some cases causes the sloughing off of the mucous membrane surrounding the tooth. As the injections were performed under strict asepsis, he looked for the cause in the eucaïn, and modified the solution in several ways, until he reached the following formula, which has given him the best possible results:

R—Gelatin puri, 3.0 gm.;
 Natrii chlorat., 0.6 gm.;
 Acid. carbol. cryst., 0.1 gm.;
 Tropacocain, 5.0 gm.;
 Aquæ dest., ad 100.00 gm.

With this solution the anesthesia, as with the previous one, was perfect, good results being obtained in all cases except in advanced periostitis. In one hundred cases no bad effects followed the injections; in a certain proportion edema of the neighboring mucous membrane took place, but this was due to the infiltration of the solution and might have happened with any kind of solution. (The painful infiltration following the injection of the first solution may have been due to the consistence of the preparation rather than to the toxic influence of any of its components. The use of gelatin should be adopted and advised for the reasons that very little bleeding, practically none, accompanies the operation and that the danger of post-operative hemorrhage is absolutely eliminated.

RAPID METHOD OF INDUCING ANESTHESIA WITH ETHER.—In order to perform painlessly certain operations of short duration, Dr. Sudeck follows a method of anesthesia which in time will substitute the hyponitrous oxid and ethyl bromid methods. His method consists in operating during the first intoxicating stage of ether anesthesia. At first the patient is told to make a few deep inspirations and expirations, then after a complete expiration the patient is allowed to inhale from thirty to fifty grams of ether. He begins to operate immediately after the first or second inhalation, as the patient from that moment has lost all sensitiveness to pain. The operation must be performed as quickly as possible, for the period of partial unconsciousness lasts only until the beginning of the period of excitement.

Dr. Sudeck has operated in more than two hundred cases, among which we find not only such simple operations as the lancing of abscesses and the extirpation of lymphatic ganglions, but also such operations as the amputation of the arm, foot, or leg.

In order that the operation should be successful, it is absolutely necessary that the respiratory movements shall be performed with the same amount of intensity in spite of the penetrating odor of ether.—*Archives de Stomatologie*.

TREATMENT OF NOMA (GANGRENOUS STOMATITIS, GANGRENE OF THE MOUTH, CANCRUM ORIS).—Noma is a special form of gangrene of the mouth. It is principally observed in children during the first six years of life, more frequently in girls than in boys. It is common in weak children of the poorer classes and is very seldom found in children of the better classes. It is a disease which is more often recorded in cold and damp countries. It is not a primary disease, but is often the consequence of certain infectious diseases, such as typhoid fever, chronic enteritis, measles, scarlatina, whooping-cough, tuberculosis, also of membranous stomatitis, and of certain chemical intoxications (hydrargyrisms). Generally noma begins in one of the cheeks or upon the lower lip,—seldom upon the upper,—in the form of a yellowish vesicle. This vesicle varies in size from that of a pea to that of a lentil, and when it breaks it is changed into an indolent ulcer. Very soon this ulceration spreads, its bottom becomes pultaceous, and its base tumefied. As a matter of fact,

this swelling may constitute the initial manifestation of the disease. After this a scar, which does not become visible until the third or fourth day and sometimes later, is formed. Very often it is covered with a phlyctena. The swelling is surrounded by a grayish zone, and outside of this by a large band of a few millimeters at the level of which the skin is red and bleeds easily. The breath becomes very offensive, and a bloody liquid mixed with pultaceous matter is exuded through the mouth. Strips of gangrenous tissues become detached at the slightest effort without the patient feeling any pain. The sphacelus is generally circumscribed to a zone whose diameter is never more than a few centimeters; sometimes it spreads rapidly and attacks the nose, eyelids, chin, and even the neck, and becomes aggravated by a necrosis of the maxillæ. In girls it becomes sometimes complicated with gangrene of the vulva.

Treatment.—The initial gangrenous zone should be thoroughly cauterized with nitric acid, hydrochloric acid, acid nitrate of mercury, and the hot iron. By this means it is possible to eliminate the disease at its onset. It is necessary that this cauterization should destroy entirely the morbid focus. If necessary, this operation should be performed every two or three hours until it is ascertained that the spreading of the sphacelus has been arrested. Previous to the application of the cautery, the tissues can be made insensitive by means of a local application of cocain. Internally, small doses of potassium chlorate, as well as tonics, preparations of quinine and iron, should be prescribed, also a nutritious diet, milk, bouillon, wine, jellies, eggs. In order to get rid of the fetidity of the breath the patient is directed to use a mouth-wash of a weak solution of potassium permanganate.—*Revue Internationale de Clinique et Thérapeutique.*

[The prognosis of this variety of cancrum oris is very often fatal, death being caused by a general purulent infection, by a septic broncho-pneumonia, or by profuse hemorrhage due to the falling of the scar. This disease always causes considerable facial deformities, so that those who recover always bear its traces for life.—Ed.]

OXYGEN AS A TREATMENT FOR BOILS AND CARBUNCLES.—A new treatment for boils and carbuncles has been advocated recently by Dr. Thiriard, professor of clinical surgery at Brussels. It consists in the injection of oxygen into the tumor formed by the boil. A receptacle containing oxygen under pressure may be used, and put in communication with a needle, which is inserted under the skin. One injection is found sufficient for an ordinary boil; for a carbuncle it is well to inject oxygen through the different openings. The anthrax becomes painless in a relatively short space of time, and the inflammation disappears in a few days.—*Journ. Amer. Med. Association.*

IMPRESSIONS OF THE LOWER MAXILLA.—Dr. Fount recommends, before pressing the tray down on the alveolar ridge, to direct the patient to raise the tip of the tongue to the roof of the mouth. This will draw the lingual muscles from under the tray, while the other muscles will be in normal position. This is particularly desirable in flat mouths.—*Dental Record.*

EMERGENCY CROWN.—Grind the root down to the gum margin, measure the distance from the gum margin to the incisal edge of the adjacent tooth and the width of the space where the crown is missing; select the proper shade and send to the depot for a suitable facing, if you have not one at hand. While a facing is being selected enlarge the root-canal to the proper depth and adjust a post of such length that the lower incisors will not strike it as they articulate, and sufficiently set back lingually in the root not to force the facing out of the line of the arch. Flatten slightly the projecting end of the post and roughen the section to be imbedded in the root. Fill the root-canal with a large, soft gutta-percha cone; heat the post, grasp the flattened end with a suitable pair of pliers, force it to place in the root-canal, and trim away the surplus gutta-percha; slightly roughen with a coarse sandpaper disk the interproximal contact points of the adjacent teeth. The facing should have arrived by this time; grind it to fit properly; roughen the back on the facing with a carborundum

wheel and bend down the pins so that they are at an angle of about forty-five degrees to it.

Dry the facing, the adjacent teeth, the post and root thoroughly; mix thickly some quick-setting cement, coat the back of the facing and cover the end of the root and post with it, then force the facing into this mass of cement and hold it in position until the cement has set slightly; coat the cutting edge of the lower incisors and have the patient bite; then, opening the mouth, trim away the surplus cement, clean out the interproximal spaces, and contour as you please, but leave the cement adhering to the interproximal contact points to give greater security of retention. By this time the cement is thoroughly set and the patient may be dismissed.

The time consumed in this operation should not be more than a half-hour if you are within three blocks of a dental depot, and you may accomplish it in fifteen minutes if you have the facing at hand.—J. E. NYMAN, in *Dental Review*.

A CAUTION IN THE USE OF ARSENOUS ACID.—When using arsenous acid care should be taken not to apply it to a cavity that had been previously treated with hydrogen dioxid, as this compound is an oxidizer and would convert arsenous into arsenic acid, which is more caustic, more diffusible, and more toxic than arsenous acid.—E. TOUVET-FANTON, in *l'Odontologie*.

METHOD OF ADJUSTING RUBBER DAM IN APPROXIMAL CAVITIES REACHING BEYOND THE GUM MARGIN.—A piece of asbestos paper moistened with oil of cloves is placed over the pulp; then a small piece of cotton moistened slightly with carbolic acid is applied against the gum, and over this a large piece of cotton saturated with a thickened solution of tincture of benzoin is placed, packing the cotton tightly. This seldom fails to force out the gum in twenty-four hours. The benzoin would keep it sweet if it remained a week. It also makes it nearly as hard as sandarac and never causes pain to the pulp.—W. A. SPRING, of *Dresden*, in *Dental Review*.

TO REMOVE BLACK STAINS FROM PORCELAIN OR GLASS INLAYS.—Apply borax to the darkened surface and submit the inlay to the blue flame of a Bunsen burner. The flame should be directed against the surface with a mouth blow-pipe and the current of air should be intense.—*Exchange*.

PASTE FOR FILLING ROOT-CANALS.—

Iodoform, 90 grains;
Oxid of zinc, 45 grains;
Pulverized charcoal, 45 grains;
Oil of cloves, 67 grains.

This paste does not solidify in the bottle in which it is preserved, and keeps indefinitely. Before using it is mixed with tincture of myrrh to the consistence of cement. This paste serves for the filling of root-canals or for the capping of pulps. It is carried to the canals alone or by means of asbestos fibers heated over the Bunsen burner flame, using for this purpose an iridio-platinum smooth broach.—*Exchange*.

IMPRESSIONS OF CAVITIES FOR PORCELAIN INLAYS.—Where the cavity is an interstitial one and not too high, I cut the foil to required size and take a short length of floss silk. Fold the foil just sufficiently to hang upon the silk. Pass the silk and foil as high as required between the teeth, and fix by tying the silk around the tooth. You now have the foil securely held in position, and have both hands free for the subsequent manipulations for packing cotton, wool, amadou, or whatever may be used, and for burnishing the foil over the edges. In cavities reaching just under the gum I have found the small wire-holders, right and left, to be exceedingly useful. They can be bent up and filed to shape in a few minutes. It is simply curved wire filed to a feather edge, and bent to the contour of the tooth. The gold foil is just caught over the edge of the wire and carried under the free margin of the gum, and held in that posi-

tion while the impression of the cavity is got in the usual way. The foil in either case fitting everywhere to your satisfaction, take out all the packing and fill the matrix with wax. Take a small pellet and work it in with a burnisher till it fills the cavity without overlapping edges. The silk can now be cut, or the wire removed, and the matrix taken out of the cavity without fear of altering its shape. If it hang at all, it can generally be removed by lightly sticking an excavator into the wax. The matrix and wax is then invested in plaster and asbestos, in the proportion of one to three. This makes a better investment than all asbestos, as it does not shrink. The plaster is necessary, as asbestos alone is not binding enough to prevent the gold matrix floating away when washing out the wax.—Mr. COUNCELL, in *Journal of the British Dental Association*.

NECESSITY OF NORMAL SOLUTIONS FOR LOCAL ANESTHESIA.—It has been claimed that certain of the disturbances noted after the injection of cocain or eucaïn are due to the fact that the fluids are not isotonic with the blood serum. These disturbances can be entirely obviated if the solution is rendered normal by adding salt. Braun and Heinze in recent works have recommended the formula: Eucaïn B 1, sodium chlorid 8, distilled water 100, at body temperature.—*Journal of the American Medical Association*.

REPLANTATION DURING ACUTE INFLAMMATION.—Dr. Ed. Gulikers, of Liège, Belgium, reports the successful treatment of a dento-alveolar abscess by the extraction and subsequent replantation of the affected tooth. Dr. Gulikers was led to perform this operation from the fact that in cases of acute dento-alveolar abscesses it is easier and less painful to extract the elongated tooth than to drill an opening through the crown. When extracting an abscessed tooth for immediate replantation great care should be exercised in applying the forceps, as it is important to avoid injuring the pericementum. After extraction the tooth is washed in a 1 : 2000 solution of mercuric bichlorid, the canal is opened, cleaned, and filled through the apex, and the alveolus is washed and freed of blood-clots. After all these preliminary steps are accomplished the tooth is placed in the alveolus and is maintained there by means of an appropriate splint. Dr. Gulikers has been very successful with these replantations in spite of the presence of acute inflammatory phenomena.—*Progrès Dentaire*.

HINTS, QUERIES, AND COMMENTS.

A METHOD OF DUPLICATING PLASTER MODELS.—For various reasons it often becomes necessary to obtain duplicates of plaster models, and where these are to be reproduced in large number,—for example, to meet the requirements in laboratory technic teaching,—I have found the method first suggested to me by Prof. George B. Snow, of the University of Buffalo, to be eminently satisfactory. The method consists in preparing a flexible rubber matrix from the original model and using this matrix for the casting of any number of replicas which may be desired. The matrix is prepared as follows:

After properly shaping the model which it is intended to reproduce, it should be rubbed by the thumb and finger with a small quantity of talcum powder over its entire surface until a smooth glossy finish is obtained. The treatment with talcum powder is done while the casting is still damp, after which it is allowed to dry thoroughly. The model is then coated with a solution of vulcanizable rubber; what is known in commerce as stamp rubber is best adapted for the purpose. The solution is made by dissolving a piece of the rubber about one inch square

in one-half ounce of carbon disulfid. When completely dissolved the preparation is ready for use, and is applied to the model with a small stiff brush. The model should be coated thoroughly, and after allowing it to dry for a few moments it is coated again and the operation repeated three or four times. The stamp rubber is then to be stripped from its supporting cloth and cut into strips of a size and form which will permit the rubber to be applied smoothly on the model. The strips should not overlap, but be applied edge to edge and end to end, placing the fresh side from which the cloth has been removed against the model, to the rubber surface of which it will cohere very closely. If proper care be taken in the application of the rubber strips, the material will be conformed to all the irregularities of the model, so that a perfect duplicate may be obtained. Wherever the edges of the applied rubber come in contact they should be first coated with the rubber solution. After the entire surface of the model has been covered with one thickness of rubber, a strip one-half inch in width should be carried around the edge of the model for the purpose of reinforcing it with a sufficient body of rubber for the purpose of maintaining the rim of the matrix in proper form. Wherever seams or joints occur, it is well to apply strips of rubber about one-quarter of an inch wide over the joints to strengthen them, in each case applying the rubber solution before joining the strips. When the coating of rubber has been carefully and thoroughly done, the matrix is ready to flask.

The flasking is done with one mix of plaster. The lower part of the flask is to be nearly filled with the plaster batter, and all air bubbles jarred out. Then the surface of the rubber is coated with a thin layer of plaster to prevent air spaces or bubbles. It is then pressed down into the soft places in the lower part of the flask, and the upper section is placed in position. The flask is then filled, the top put on, and the whole bolted together. As soon as the plaster is hardened the matrix is ready to vulcanize. It should be subjected to a temperature of 250° F. for thirty minutes, and allowed to cool slowly. The flexibility of the rubber matrix makes its removal from the cast an extremely simple matter, and any number of duplicates can be cast from the matrix, each of which will be an accurate reproduction of the original. In making the castings, the plaster batter should be poured carefully into the matrix, all air bubbles jarred out before the matrix is completely filled, after which it should be filled with plaster slightly more than full and a glass plate pressed down upon the upper surface of the matrix until almost in contact with the rubber rim, when the whole should be inverted so that the filled matrix rests upon the glass plate without strain or distortion, and be left undisturbed until complete hardening of the plaster has taken place.—A. DE-WITT GRITMAN, D.D.S., *University of Pennsylvania, Philadelphia, Pa.*

ANNEALING TIN.—But few practitioners seem to be aware of the wonderful degree of plasticity which can be developed in tin foil by careful annealing.

Dr. T. D. Shumway has repeatedly called attention to the desirability of annealing tin before inserting it as the filling material, and in addition to the methods which he has suggested,—viz, of direct annealing on mica over a flame or by the use of a heated plugger,—most excellent results can be obtained by the use of the Custer annealing tray, in which the

degree of temperature is practically controllable and may be maintained at just the right point with a graduated electrical resistance. It should be borne in mind that the annealing process should not be carried on for an indefinite length of time, as at that elevated temperature oxidation of the surface of the tin occurs with considerable rapidity and interferes with the homogeneity of the resulting filling.

The pellets on pieces of foil should be placed upon the annealer, previously regulated to the required temperature.

The difference in working qualities developed by the annealing process constitute an improvement so great as to almost include tin foil among the plastics.

CLINIC ON CROWN- AND BRIDGE-WORK.—At a clinic given by the Western Dental College Alumni Association at Kansas City, Mo., on April 29th, the

FIG. 1.

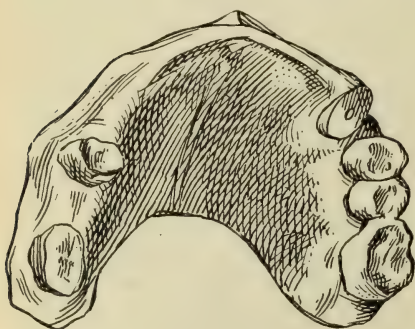


FIG. 2.

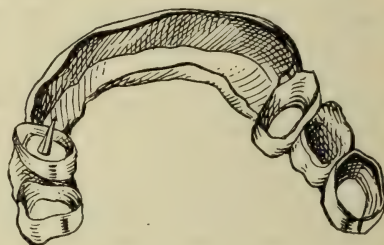


FIG. 3.



following work was demonstrated by Dr. U. S. Hougland: A porcelain bridge extending from the upper left first bicuspid to the right second molar, the anchorages consisting of the left canine and first bicuspid, and the right second bicuspid and second molar. Considerable absorption had taken place after the loss of the teeth, and an ordinary gold bridge had not proved satisfactory.

Dr. Hougland's procedure was as follows: The teeth were prepared the usual way, and shell crowns of 28-gauge platinum were fitted to the bicuspid and molar; the canine root was prepared as for a Richmond crown, and a platinum cap and pin fitted to it; the anchorages were then placed in position and an impression taken. After securing a model with the anchor crowns in proper position, a saddle of 36-gauge platinum was swaged directly on the model with the Parker swaging device. The width of this saddle was such that lingually its edge would follow the line of the lingual surfaces of the teeth. Labially it extended as high on the gum as was

deemed necessary for contour. The model was then placed on the articulator; the saddle, being placed in position on the model, was held by a little wax along its lingual border; the facings were next selected. As these were not to have metal backings placed on them the exact shade required was chosen, there being no danger of subsequent change of shade, as American teeth were used. For the space between the right second bicuspid and second molar a saddleback tooth was used. The facings were set up and waxed in their proper position; they were then cased in with investment material, leaving the wax alone exposed, as in an ordinary gold bridge. After drying, the wax was removed and a square iridio-platinum bar, 16 gauge, was bent to pass from the left bicuspid crown across the cap on the canine root to the right bicuspid crown. This bar fitted snugly under the pins of the teeth and rested on the saddle. A short bar was also fitted between the bicuspid and molar crown on the right side. The work was now carefully tacked together with solder, the pins to the bar, the bar to the saddle, and the saddle and bar to the anchor crowns, thus forming what might well be termed the "framework" of the bridge. The solder used both in making the crowns and in uniting the parts was composed of three parts pure gold and one part platinum. The investment was now removed and the work tried in the mouth to correct any possible maladjustment.

The next step was the baking of the case. Ash & Sons' body was used, applied and baked in usual manner, care being taken to secure proper contour, both lingually and labially, and perfect color for the artificial gum. As a final step, after the baking was finished the platinum crowns were heavily gold-plated. The work when placed in position presented a very natural appearance, and is being worn with great satisfaction by the patient.

Fig. 1 shows the model, Fig. 2 the bridge (posterior view), and Fig. 3 the piece in position.—*Reported by* DR. F. G. WORTHLEY, *Kansas City.*

EXTRAORDINARY CASE OF EXCESSIVE HEMORRHAGE.—E. M., aged fifty-two years, a hacendado or planter, came to my office and had extracted two upper canine roots and six lower roots, *i.e.*, the four incisors and two canines, preparatory to the insertion of a full upper and lower denture. The roots were extracted at 10 A.M. At 3 P.M. I received word to call at his city residence, and was informed that the patient was in a very weak condition, having lost a great quantity of blood, the hemorrhage after extraction being excessive. On arriving at his house I found him in a very weak condition, the blood flowing from the alveoli where the roots had been extracted, and also from the gums throughout the entire extent of the alveolar processes both upper and lower.

Treatment.—The alveoli were copiously syringed with cold water and the clots of coagulated blood removed. The alveoli were then stopped with pledgets of cotton saturated with tannic acid and a compress of cotton placed around the whole extent of the gums, a bandage placed under the lower jaw and tied over the top of the head, and the patient put to bed with the head in an elevated position.

After waiting some time and finding that the hemorrhage still continued, the compresses and pledgets were removed, the alveoli again copiously syringed with cold water and again stopped with cotton and tannic acid. I had anticipated the situation and brought with me the necessary materials. Having taken a wax impression of the upper and lower jaws, I made plaster models and struck up on the dies, made of fusible metal, two silver plates of about 30

American gauge. The inside of the plates covering the entire length of the alveolar processes were lined with cotton and tannic acid. The plates thus prepared were placed in the mouth and the jaw bandaged as before, and the patient was again put to bed, assuming a semi-recumbent position. In a short time after the insertion of the two plates lined with cotton and tannic acid the hemorrhage was successfully arrested, not only from the alveoli but also from the entire surface of the gums and alveolar processes.

Family History.—A brother of this patient, aged thirty-five, received a wound on the left shoulder about four years ago, causing a severe hemorrhage from which he died. He also had a sister who died from hemorrhage after the extraction of a tooth. Both of these facts conclusively evidence an hereditary hemorrhagic diathesis.

This was the most extensive, alarming, and obstinate case of hemorrhage occurring in my practice, covering more than forty years.—JOSEPH SPYER, M.D., D.D.S., *City of Mexico, July 31, 1901.*

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

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LIST OF UNITED STATES PATENTS PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING JULY, 1901.

- July* 2.—No. 677,565, to **JESSE A. DUNN**. Dental clamp.
 " —No. 677,577, to **HOWARD N. LANCASTER**. Dental forceps.
 " 9.—No. 677,947, to **JAMES W. COWAN**. Dental floss holder.
 " —No. 677,975, to **JAMES M. GILBERT**. Dental apparatus.
 " —No. 678,056, to **CHARLES H. STADLINGER**. Tooth-powder box.
 " —No. 678,101, to **JAMES W. COWAN**. Package of dental floss.
 " —No. 678,182, to **JAMES W. IVORY**. Tooth or dental clamp.
 " 16.—No. 678,374, to **GEORGE E. BROWN**. Orthodontia wrench.
 " —No. 678,452, to **EDWARD H. ANGLE**. Tooth regulator.
 " —No. 678,453, to **EDWARD H. ANGLE**. Tooth regulator.
 " —No. 678,594, to **JOHN W. TULLY**. Case for tooth-brushes.
 " 30.—No. 679,647, to **JOHN S. THOMPSON**. Artificial tooth.
 " —No. 679,714, to **JAMES L. WILLIAMS**. Cap for fixing crowns to teeth.

THE
DENTAL COSMOS.

VOL. XLIII.

PHILADELPHIA, OCTOBER, 1901.

No. 10.

ORIGINAL COMMUNICATIONS.

ON CERTAIN PREPARATIONS OF THE JAWS AND TEETH AND THE
METHODS EMPLOYED IN MAKING THEM.

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FOR a number of years, I have from time to time been occupied in making anatomical and histological preparations from the jaws and teeth, some of which are not often met with outside of my own collection, and in which the use of new methods of staining has given results in part beautiful as well as instructive.

The attempt to pictorially reproduce these preparations has been only partially successful, since it is not possible to bring out the transparency and the characteristic luster of the dentin, which add so much to the beauty of sections of the teeth. My efforts were at first directed to producing sections of large complex or compound teeth (horse, hippopotamus, elephant), but subsequently extended to sections of the human jaws and teeth.

As a rule, the most satisfactory results are obtained with fresh material, which, however, in many cases (elephant, hippopotamus, etc.) cannot be procured. Where we have fresh material at our disposal (for instance, teeth of the horse, ox, etc.), it should at once be cut into sections about one-quarter inch in thickness and hardened in absolute alcohol or in Müller's fluid, some weeks being necessary to complete the process. Where a rapid hardening is desired, it may be accomplished by a mixture of one part of formalin to nine parts of Müller's fluid, which, particularly if kept at a temperature of some 40° C., hardens the tissue sufficiently in two to four days, depending upon the thickness and density of the sections. When sections are to be made from dry teeth, there is nothing to be gained by subjecting the material to a hardening

process, but the sections, after grinding, should remain for some hours in water in order to drive out the air as far as possible and to render the tissue more permeable to the staining fluid.

METHOD OF PREPARING GROUND SECTIONS OF THE TEETH, WITH PARTICULAR REFERENCE TO THE MOLAR OF THE ELEPHANT.

I know of no undertaking in the way of section-grinding more difficult than that of making a section through the greatest plane of the molar of an elephant,—*i.e.*, parallel to its lateral surfaces. Whether we grind the tooth down from both sides or first cut sections about one-half inch thick (thinner ones are liable to break) with the band-saw running at high speed, we will find the task extremely difficult. The saw enters the cement very readily, but as soon as it reaches the enamel it is almost immediately dulled before penetrating more than one-half inch. It must then be re-sharpened, when another slight advance may be made. I have usually been obliged to wait at least a week for a slice to be sawed off an elephant's molar, and one large firm in Hamburg wrote me that they had ruined their saws without succeeding in cutting even the tooth of a hippopotamus.

To grind down a tooth, or even a section of a tooth one-half inch thick, requires a coarse-grained corundum wheel some ten inches in diameter, mounted horizontally and running at a high speed. I have eight Norton corundum wheels of different grades, from the finest to the coarsest, obtained from Schuchardt & Schütte, of New York, who have a branch in Berlin.

I have found it best to hold the section, while grinding, with the hand, in which case the fingers may be protected by rubber caps. Sometimes, however, the sections were fastened to flat blocks of wood or to ground glass by means of plaster of Paris, which will be found particularly advantageous in grinding dry sections, in which the enamel is often so brittle that it breaks away from the dentin unless supported in some way or other. When the section is sufficiently thin, one may loosen it from the block by placing it in water over night.

A considerable difficulty is caused by the stone wearing away unequally and becoming grooved under the action of the enamel. Naturally, toward the last, one must use a fine-grained stone, otherwise the section is liable to be torn to pieces; but even then the last hour of grinding is one of great anxiety. One is desirous of getting the section as thin as possible, and at the same time is under constant dread lest the brittle enamel may chip away at some point or other, thus annihilating, or at least seriously impairing, the work of many days.

Having decided to go no further, the section must be polished on a fine stone. It is then ready for staining.

Transverse sections are ground in the same way, but the danger of breaking is still greater than in longitudinal sections.

Sections of molars of the horse, ox, warthog, waterhog, etc., may be cut by means of a large knife-edged corundum wheel run by electricity, or by a foot lathe, if one has time, energy, and endur-

ance enough. I have cut even a molar of a hippopotamus in this way, although a large number of wheels were sacrificed in the process. These teeth may also be cut with a very thin-edged, coarse file, used alternately with a saw, and this, I think, is the preferable method. For holding sections of this size, in grinding, cork may be used to advantage. I have found a slice of fine cork, about one-quarter inch thick, glued to a flat block of wood to be very serviceable, though on the whole I prefer cork alone, and then about one inch in thickness. The process of grinding is the same, though, of course, much simpler than in the case of the elephant's molar. The grinding of sections from human teeth is, in comparison, a very simple matter, and one can readily make fifteen to twenty of them in two hours.

METHODS OF STAINING GROUND SECTIONS.

The hard tissues of the teeth take on coloring matter, as is very well known, with considerable difficulty. Sections of teeth, human or animal, subjected for hours to the action of solutions of most of the stains commonly in use, excepting hematoxylin and to a certain extent eosin and thionin, will be found, on dehydrating and clearing up, to have taken on but a very slight stain, if any at all. If, however, the sections, before being put into the staining fluid, are subjected for from one to five minutes, according to the effect it is desired to produce, to a two per cent. solution of hydrochloric acid, which produces a very slight, superficial decalcification of the dentin and cement, they take on the coloring matter much more easily. Where very thin sections of fresh material are to be stained, a one per cent. solution should be used, as the stronger solution in such case acts too intensely. The stains employed were eosin, triacid, thionin, picrocarmin, picric acid, acid fuchsin, and hematoxylin, either separately or in various combinations.

In staining with eosin, the concentrated aqueous solution is used. The section, after being treated with the solution of hydrochloric acid, is thoroughly washed in water to remove the acid and brought into the staining fluid, where it remains for five to ten minutes. (It is best to remove it from time to time and wash it in water to determine the depth of the stain, as an overstain with eosin is difficult to remove.) The section is washed in water, transferred to dilute alcohol, and then to absolute alcohol. It is finally cleared up in xylol and mounted in Canada balsam. The enamel should be unstained, the cement deep red, and the dentin a delicate bluish-red (Plate I, Fig. 2, and Plate II, Fig. 15).

Triacid should be diluted with five to ten parts of water before using. The degree of dilution must be a matter of experience, since the preparations of triacid one obtains on the market vary greatly in strength. The cut remains from five to ten minutes in the stain, and is then washed and treated for a few seconds with a one per cent. solution of hydrochloric acid to develop the red color. The further treatment is the same as with eosin. Triacid is a comparatively new stain, introduced by Ehrlich, and has the following composition:

Orange G, concn. aq. sol., 120 parts ;
Acid fuchsin, 80 ;
Methyl green, 100 ;
Water, 300 ;
Absolute alcohol, 180 ;
Glycerin, 50.

The preparations obtained from different dealers vary so much in composition and staining qualities that each one must be tested before using. If it is found that the red color predominates, one may add methyl green, or *vice versa*. With this preparation one is able to produce a differential staining between the dentin and cement which depends greatly upon the manner in which the tissue has been preserved and the composition of the stain. In general, while the enamel remains entirely unstained, the cement takes on a deep red color, while the dentin varies in shade from pink to bluish- and brownish-red (Plate I, Figs. 1, 3, 8, 10, 13, 17, 20; Plate II, Figs. 2, 4-7, and 18).

Thionin is also a comparatively new stain, introduced by Ehrlich. For staining dental tissues, I dilute the concentrated alcoholic solution with four parts of water. The results obtained with thionin were partly very good, but not always equally so. Sections from a dry tooth of *Hydrochoerus capibara* (gigantic water-cavy) treated with the two per cent. solution of hydrochloric acid and then left for some hours in the thionin solution showed a very delicate blue stain in the dentin and deep blue in the cement, while the enamel, as always, remained unstained (Plate I, Figs. 11 and 15). Cross-sections of the molars of *Phacochoerus* (warthog) showed the striking result of the dentin taking on the color much more intensely than the cement. The remains of the pulp appeared dark blue, the dentin a deep purple and the cement light blue, the enamel unstained (Plate I, Fig. 7). Likewise in cross-sections of horse teeth, the dentin took on the coloring matter much more actively than the cement.

Thionin is slightly soluble in xylol, and consequently the sections may fade in the course of time if mounted in xylol balsam, as I have found to my dismay. For this reason it is preferable to use balsam dissolved in chloroform or oil of turpentine, and to avoid transferring an excess of xylol to the balsam in mounting.

THIONIN AND TRIACID.

In some cases, thionin shows a stronger affinity for the dentin than for the cement, whereas triacid almost invariably stains both cement and bone more deeply than dentin. It would seem possible, accordingly, to obtain a differential staining by using both fluids, by which the dentin would appear bluish and the cement reddish. As a matter of fact, ground sections left for twenty-four hours in thionin, then washed in water and subjected to the triacid solution for three to five minutes, show the dentin deep blue, while the cement takes on a reddish color. This result is, however, not constant, and can sometimes be only approximately obtained by treating the section alternately with the two fluids. Sometimes the differentiation fails altogether, and occasionally I have seen just the

opposite of what one would expect to take place, the dentin becoming red and the cement blue, as when stained with thionin and eosin.

THIONIN AND EOSIN.

Preparations subjected to thionin for some hours, and then to a concentrated aqueous solution of eosin for from one to five minutes, give a mixed blue and red staining; usually the blue predominates in the cement and the red in the dentin. In some cases the result is very marked, as seen in Plate I, Fig. 4. This section, which was many years old and totally dry, was treated with the acid bath for three minutes, thionin twenty-four hours, and eosin one minute. The dentin is pink, the cement blue, and the enamel unstained.

Sections subjected to the acid bath for two to three minutes, thionin twenty-four hours, eosin one minute, gave: dentin, red; cement, blue; carious enamel, pink or dirty blue; interglobular spaces and carious dentin, blue (Plate I, Figs. 6 and 16).

The red, white, and blue is sometimes well brought out in sections of horses' teeth. Here the cement stains in some parts much the same as the dentin, but the numerous vascular canals become blue; giving the cement as a whole a blue color and a strikingly beautiful appearance under the microscope. This differential staining, while it has regularly occurred in all the sections of human teeth I have prepared, is very precarious when applied to teeth of the horse, and we frequently find a column of dentin stained in alternating red and blue zones. The effect produced is often exceedingly beautiful.

THIONIN AND PICRIC ACID.

The most remarkable of all staining results are obtained with thionin and picric acid. Ground sections of molars of the horse or ox, after being subjected to the two per cent. solution of hydrochloric acid, are left for some hours in the thionin solution, then washed and treated with picric acid for from ten to thirty seconds, washed again, dehydrated in alcohol, cleared up in xylol, and mounted in Canada balsam. The dentin becomes reddish-blue to reddish-violet to brown-red, sometimes different colors alternating in streaky or concentric zones, the cement generally blue to green (Plate I, Figs. 9 and 12; Plate II, Figs. 3 and 13), though in some places the yellow color and in others the reddish-violet predominates.

The internal cement usually stains somewhat differently from the external. In some preparations from fresh horse teeth the cement corpuscles and offshoots appeared a beautiful brown-red on the light green or yellow basis substance. In other cases the nuclei of the bone corpuscles appear deep blue, the body being unstained or very light blue (Plate II, Fig. 10).

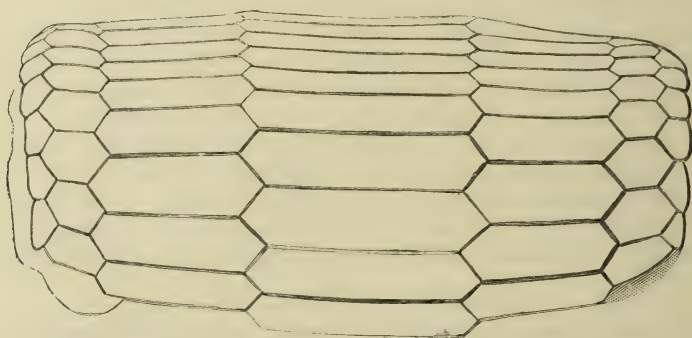
The dentinal fibrils stain very much the same as the offshoots of the cement corpuscles. Sections of pathological ivory, of odontomes, etc., take on a variety of brilliant colors; many shades of blue, green, red, and purple, of which the chromo-lithograph (Plate II, Fig. 12) scarcely gives an adequate conception.

Very beautiful results are likewise obtained by treating ground sections of vaso-dentin in the above manner. The results are, how-

ever, not constant, and vary somewhat according to the way in which the tissues have been hardened, as well as to the varying lengths of time during which the cut is exposed to the different reagents; and sometimes two sections treated in exactly the same way give different results.

One of the most brilliant results in the way of staining was obtained by treating a cross-section of the upper denture of *Myliobatis marginata*, or *Rhinoptera javanica* (a species of rayfish), with the thionin-picric acid stain. In this fish, the teeth are arranged in seven rows from the convex surface of the (cartilaginous) jaw. In the specimen before me (Fig. 1) the whole dental armature is $9\frac{1}{2}$ cm. long, and measures $7\frac{1}{2}$ cm. over the convex surface. The plates of the middle row are 3 cm. long and twelve in number;

FIG. 1.

Upper dental armature of *Myliobatis marginata*. (Natural size.)

those of the first lateral row 2 cm. long, those of the second row nearly 1 cm. in length, while those of the third or outermost row are only small lozenge-shaped blocks about 5 mm. on a side.

A section cutting the jaw and teeth at right angles through the middle row of plates, stained with thionin and picric acid, is shown in Fig. 16, Plate II.

A portion of one of the plates magnified about fifty diameters is shown in Fig. 17, Plate II.

Very instructive, as well as beautiful, preparations of the hard tissues of the teeth may be obtained in the following simple manner: Grind the tooth down from whatever surface one may wish to study it until it becomes perfectly smooth. Expose the smooth surface for from two to five minutes to the action of the two per cent. acid solution, and then rub it thoroughly with a pledget of cotton dipped in a concentrated solution of triacid; after which wash the surface with the acid solution, and then with water, and allow it to dry. The different tissues, which before staining may have been scarcely distinguishable, now stand out with perfect distinctness. The preparations illustrated in Fig. 10, Plate I, and Figs. 6, 7, and 18, Plate II, were prepared in this way from old and thoroughly dry material, which I have often found to stain in this manner better than fresh material.

Where the tubes or plates of the tooth are curved, as is particularly the case in the molar of *Phacochærus* (warthog), the surface may be ground correspondingly curved by using a small wheel mounted vertically and grinding with the edge. If the color loses its brightness in course of time, it may be freshened up by washing the surface with the acid solution, or it may, of course, be restrained. Preparations of this kind are particularly useful in class instruction.

METHODS OF GRINDING SECTIONS WITH SOFT TISSUES.

The von Koch-Weil method of grinding sections so as to preserve the soft tissues (pulp, pericementum, etc.) is well known, and will not be dealt with here. I did not employ it to any extent, since my object was to obtain preparations for anatomical or coarse histological demonstrations, and for this purpose equally good, or, indeed, better, results are obtained by simpler methods.

In preparing the jaw for grinding horizontal sections, the teeth are first ground or sawed off on a level with the margin of the alveolar process, and then two sections of the process, each about one-quarter inch thick, cut off with a fine saw. These sections are then placed in the hardening fluid for a length of time depending upon the rapidity with which the fluid acts, or until the soft tissues are completely hardened. For hardening, I formerly used a concentrated alcoholic solution of sublimate, but more recently I have abandoned this, as it appeared to me that tissues hardened in sublimate did not always stain well. I now use either absolute alcohol, Müller's fluid, formalin, or a mixture of ten parts of formalin to ninety parts of Müller's fluid.

Sections hardened in Müller's fluid should be left in running water for several hours, or over night; afterward in dilute alcohol, then absolute alcohol, and finally in a mixture of equal parts of absolute alcohol and ether in succession, in the usual manner preparatory to imbedding in celloidin. The more thoroughly the tissue is dehydrated, the better the result will be; it should accordingly be left for about a week in absolute alcohol, and the alcohol changed daily. The same applies also to the mixture of ether and alcohol. It is then brought into a large quantity of a thin solution of celloidin, which is allowed to evaporate very slowly, so that at the end of three or four weeks the celloidin has become hard. When sufficiently hard, it is fastened to a block of wood, roughened on the surface, by means of a celloidin solution, and then taken to an ivory turner, who cuts it up into sections about $\frac{1}{2}$ to 1 mm. in thickness, which may then be ground down to the desired thinness on a large corundum stone.

If the process has been well carried out, and, in particular, if pains have been taken to completely dehydrate the specimen, using alcohol which is as free from water as it is possible to procure it, we may obtain preparations which are not only anatomically very beautiful, but in which the soft tissues are fairly well preserved. It is a very great advantage of this method that one can obtain ten to fifteen sections from one jaw.

More recently, on the suggestion of Dr. Kirk, I have tried the

acetate of amyl as a substitute for alcohol and ether for dissolving the celloidin. This solution, on gradually thickening, at first takes on a syrupy consistence; then gradually becomes more and more sticky (gluey), and finally tough, almost hornlike, and semi-transparent. It cannot at all be used where cuts are to be made, but seemed to promise very well for ground sections.

Ground transverse sections of the jaw with longitudinal sections of the teeth may be obtained by sawing the jaw into sections, each containing one tooth, and then grinding the section down on both cut surfaces sufficiently to slightly expose the pulp, when it should be placed in the hardening fluid, afterward to be impregnated with celloidin and ground as described above.

To obtain sections parallel to the lateral surfaces of the jaw, a jaw should be chosen in which the molars, bicuspid, and canines lie as nearly as possible in the same plane. The jaw is sawed in two between the canine and lateral incisor, and the sections ground down from both surfaces until the pulps of the several teeth are slightly exposed, when the preparation may be treated as above. Sections of the upper jaw obtained in this manner are shown in Figs. 14 and 18, Plate I, and Fig. 8, Plate II.

Preparations of the latter kind are particularly instructive, both with reference to the "point (or surface) of contact" and to the initial stage of caries. These questions I shall discuss in a separate paper. At present, suffice it to say that dentures which to all outward appearance are completely free from caries often show its presence on the approximal surfaces of many of the teeth when prepared as above. (See Fig. 14, Plate II.)

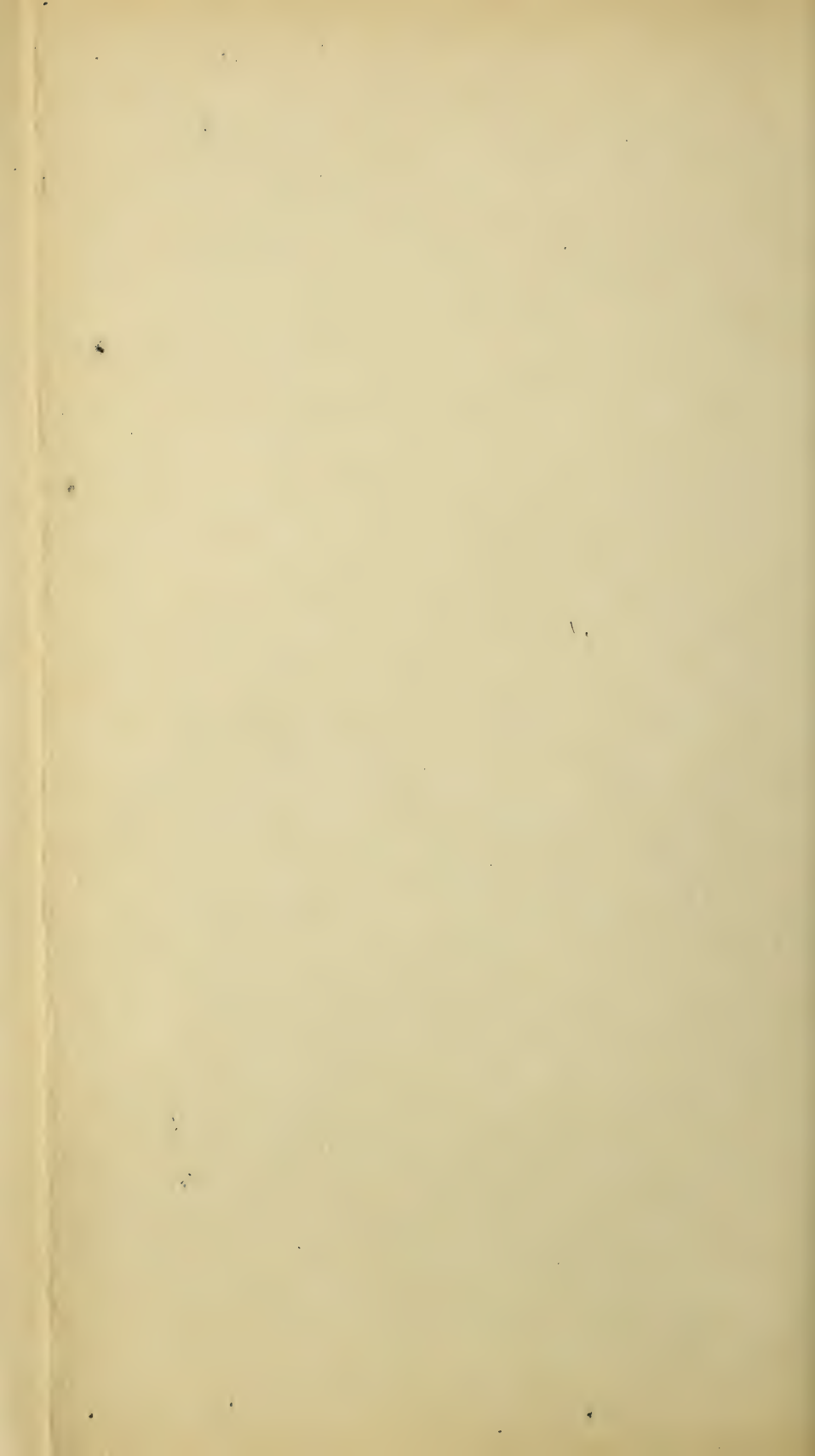
STAINING SECTIONS WITH SOFT TISSUES.

The methods of staining these preparations are practically the same as those described above for sections of the hard tissues, and the results of the staining will depend largely upon whether the sections are previously subjected to the bath of hydrochloric acid or not. In the latter case, the dentin, as well as the cement and bone, stain but slightly or not at all, only some of the stronger stains, such as eosin, hematoxylin, and thionin, affecting them to any extent. The sections, after being treated with the acid for two to five minutes, should be left in water sufficiently long to completely remove the acid before putting them in the staining fluid. The results obtained may be varied almost *ad libitum*, according to the length of exposure to the acid, staining fluid, and decolorizing agents.

In sections of the human alveolar process, with the roots of the teeth treated with thionin, the cementum takes on the color most actively,—*e.g.*, HCl two minutes, thionin twenty-four hours, gave, after prolonged treatment with alcohol: dentin, unstained; cement, blue; bone very faint reddish-blue; soft tissues, greenish-blue. In ground sections of the jaws, not subjected to the acid bath, stained with triacid, the hard tissues take on no stain, or, at most, the cement and bone, on overstaining, may show a very slight pinkish tinge, while the soft tissues (pulp, pericementum, etc.) become







deep red and the celloidin green. Where the bath has been employed, we find all the hard tissues staining to a degree depending upon the length of time during which the various reagents acted. For example, HCl five minutes, triacid five minutes, alcohol two days, stained the soft tissues deep red, bone and cement pink, dentin bluish-pink.

Thionin, triacid, eosin, acid fuchsin, picric acid, etc., may be used in various combinations, and generally give results which are well worth trying for. For example, HCl two minutes, thionin twenty-four hours, triacid one minute, stained the dentin pink to blue; cement, blue; bone red, nuclei of bone corpuscles, blue; soft tissue, blue to purple; the blue predominating in the dentin and red in the bone.

HCl two minutes, thionin twenty-four hours, eosin one minute, also stained the dentin a light pink; interglobular spaces, blue; bone, deep pink; cement, blue; nuclei of bone corpuscles, blue; soft tissue, red.

HCl two minutes, thionin twenty-four hours, picric acid fifteen to twenty seconds, produced the results shown in Fig. 14, Plate I.

This is the combination which gave the most beautiful results for purposes of demonstration and examination with lower powers of the microscope, but the results are here, again, not always the same. In this particular case the preparation had been hardened in a concentrated alcoholic solution of sublimate and kept for five years in dilute alcohol. In Fig. 16, Plate II, a section through the dried jaw of a rayfish is shown which had been subjected to the same staining process.

METHODS OF MAKING AND STAINING DECALCIFIED PREPARATIONS.

Perhaps the most unique among my preparations are cuts through the transverse diameter of the molar of the Asiatic elephant. The molar was first ground down from the morsal surface until perfectly flat and free from superficial stains or cracks, and then suspended by the roots to a depth of one-half to three-quarters of an inch in a ten per cent. solution of hydrochloric acid (the phloro-glucin solution given below would be preferable), which was daily renewed. In about ten days the enamel had been dissolved out to a depth of one-quarter inch. The tooth was then treated for several days with large quantities of water to remove the acid as far as possible, after which it was dehydrated with alcohol, then treated with alcohol and ether in equal parts and suspended in a thin solution of celloidin, where it remained for three months, during which time the solution had very slowly evaporated until the celloidin was moderately hard. (Another time I would place the tooth upright in the solution, as air-bubbles would thus be more easily avoided.) The tooth was then fixed in a large Gudden microtome by means of paraffin, and sections cut, two persons operating the big knife, one pulling and the other pushing. To my great satisfaction, the attempt was more completely successful than I had dared to hope, and very beautiful thin sections were obtained extending through the whole tooth.

These cuts, stained in eosin, triacid, and thionin, gave very satisfactory results, but various and repeated attempts to produce differential staining between the dentin and the cement had to be made before the result could be called at all satisfactory. It was very easy to stain the celloidin (which had taken the place of the enamel) green and the dentin and cement slightly different shades of red or blue, but I could not get beyond this. Finally, a fairly successful result was obtained with thionin and picric acid. The cut, which was taken from dilute alcohol (in which the material was kept), was put for fifteen minutes in water, then in the thionin solution for twenty-four hours; then washed in water, subjected to a concentrated aqueous solution of picric acid for thirty seconds; again washed carefully in water, then treated with fifty, seventy, and ninety per cent. alcohol in succession (the decolorizing process takes about twenty-four to forty-eight hours), and finally for a few moments with absolute alcohol. It is then placed in a mixture of xylol three hundred to phenol one hundred, where it should remain for some hours; and finally into pure xylol, when it is ready for imbedding in Canada balsam, an operation which is attended with considerable difficulty, but can be accomplished successfully in the following manner: Place the object-glass, which in the present case was 25 cm. long by $8\frac{1}{2}$ cm. wide, on two small supports (spools do very well) over a large sheet of paper, and cover the inner two-thirds of its surface with a thick layer of balsam. Convey the cut, after removing carefully the excess of xylol, to the object-glass and cover it with about two to three times as much Canada balsam as one estimates to be required for the mounting. Then, after having made sure that no air-bubbles are hiding under the cut, carefully drop on the cover-glass and gradually press it down by adding small leaden weights one after another. The balsam oozes out and runs over the edges of the glass in streams, and the excess must be very carefully wiped away from the object-glass. It should then be put away and left undisturbed for three to four weeks, when the weights may be removed. Later on, the object-glass may be freed from the superfluous balsam.

In these preparations a reddish-purple color predominates in the dentin and greenish-yellow in the cement, while the celloidin is a faint blue. A small portion of one of these cuts is given in Fig. 19, Plate I. Horizontal cuts extending through the whole alveolar process of the human jaw, after decalcifying with the hydrochloric acid-salt mixture of von Ebner,—

HCl, 2.5 ;
Common salt, 2.5 ;
Alcohol, 500 ;
Water, 100—

or with the phloroglucin mixture, were unsuccessful on account of the failure of the microtome to cut through the many roots. I expect, however, to overcome this difficulty.

The phloroglucin solution, now much used for decalcifying hard tissues, is prepared in the following manner: One gram phloroglucin is carefully dissolved in pure nitric acid (over the water

bath), and to the red solution resulting are added 100 c.cm. of a ten per cent. solution of nitric acid. This solution produces a rapid decalcification, while the phloroglucin has the same action as the salt in von Ebner's solution to prevent undue changes in the soft tissues.

A weaker solution, employed where haste is not necessary, is the following:

Phloroglucin, 1 ;
Nitric acid, 5 ;
Alcohol, 70 ;
Distilled water, 30.

Sections through small portions of the alveolus, hardened in the formalin—Müller solution, decalcified with the phloroglucin mixture, imbedded in celloidin, etc., gave, on staining with triacid: the bone, brick red; cement, light red; dentin, pink; pericementum, reddish-purple; empty bloodvessels, bluish-green; pulp, principally blue, and vessels of the pulp when filled with blood, from yellow to brownish-red; celloidin, light green.

STAINING OF CEMENT CORPUSCLES AND DENTIN FIBRILS.

It is generally known that attempts to stain the corpuscles of cement as well as of bone were formerly only very moderately successful. In order to obtain a view of the configuration of the cement and bone lacunæ, we made ground sections, which, being dried, were imbedded in warm, thick Canada balsam, thereby obtaining the lacunæ and their processes (filled with air or dirt) as black figures in the yellowish bone or cement.

Following up a method of staining employed by Schmorl (*Centralblatt für Pathologie und pathol. Anatomie*, October 15, 1899) for bone, I have been able to stain perfectly the cement corpuscles and their finest processes in cuts as well as in ground sections. The tissue, after being hardened as above described (in absolute alcohol, Müller's fluid, formalin, etc.), is decalcified in the hydrochloric acid-salt or in the phloroglucin solution. After thoroughly deacidifying, it may be imbedded in celloidin or cut on the freezing microtome. The cuts are stained with thionin for from two to twenty-four hours, and, after washing in water, are placed for from fifteen to thirty seconds into the picric acid solution, then again washed in water and further treated with fifty per cent., and then with absolute alcohol, cleared up in xylol, and mounted in turpentine balsam. Fig. 9, Plate II, shows a cut through dentin and hypertrophied cement treated in this manner. The cement corpuscles should, however, be reddish-black; they are too dark in the reproduction. In Fig. 10 of same plate we have an undecalcified section of bone treated with HCl two minutes, thionin twenty-four hours, and picric acid only fifteen seconds. Here the blue predominates, and the processes have not taken on the stain.

In some cases, I have obtained better results by diluting the picric acid solution with one to four parts of water and subjecting the cuts to its action for a time correspondingly longer,—i.e., forty-five seconds to one and one-half minutes.

In preparations stained in this manner, the contents of the dental tubules will be found to have pretty much the same color as the cement and bone corpuscles, depending very much upon the relative length of time during which the thionin and picric acid have acted.

ISOLATION OF THE HARD TISSUES OF THE TOOTH.

It is a well-known fact that the enamel caps of the human teeth may be isolated by boiling the teeth in a fifty per cent. solution of sulfuric acid. The dentin and cement are completely dissolved, leaving the enamel alone but slightly affected. In the same way, I have isolated the enamel of the teeth of the horse, ox, and even of a small molar of an elephant. One may boil the whole tooth or first make cross-sections of various thicknesses. In the latter case, especially where the section is less than one-quarter inch thick, the solution should not be heated quite to the boiling point, as there is danger of tearing the delicate enamel folds to pieces. We obtain by this means a conception of the beauty of the delicate and complicated folds of enamel not to be obtained in any other way. On the other hand, if the tissue is treated with dilute hydrochloric or nitric acid the enamel is destroyed, leaving only the decalcified dentin and cement. And since in the crown the dentin is everywhere separated from the cement by a layer of enamel, the destruction of the latter at the same time destroys the bond of union between the dentin and cement, so that when sections are made these two tissues come apart, except where held together by celluloid or some other imbedding material. In Fig. 5, Plate I, and Fig. 1, Plate II, we have the dentin scaffolding of an upper molar of the horse and ox in cross-section.

SOME STRUCTURAL PECULIARITIES OF THE TEETH EXAMINED.

An examination of the preparations which I have made has brought out a few points, particularly with reference to the molar of the elephant, which deserve mentioning here. The development and coarse anatomy of the molar of the elephant have been the subject of so many communications that it is not necessary to dwell upon them at length here. Suffice it to say that the existing species of the elephant get in all twenty-four molars, six on each side above and below, which follow each other in horizontal succession and of which only one and part of another in each side of the jaw is in use at any one time. The molar of the Asiatic elephant is a compound tooth (*dens compositus*), or, more concisely stated, a lamellated tooth (*dens lamellosus*), in contradistinction to the *dens complicatus* of the herbivorous animals. It is made up of a number of plates (*lamellæ*) placed side by side, succeeding each other from the mesial to the distal surface of the tooth. Each plate consists of a core of dentin with a sheath of enamel, and the plates are all united together with cement, which at the time of eruption envelops the whole tooth.

These plates are not developed simultaneously, but successively; the foremost plate first, and then progressing backward until the hindmost plate is reached. As a result of this successive develop-

ment of the lamellæ, the mesial portion of the tooth may be fully developed, erupted, and in use while the distal portion is still in process of formation. The number of lamellæ of any molar is larger than that of the preceding one. In the Indian elephant, the first molar, which erupts soon after birth, has four lamellæ; the second, appearing at the end of the second year, consists of eight; the third molar, appearing in the sixth year, consists of eleven to thirteen. The fourth, which is assigned various numbers by different authors, ranging from twelve to sixteen, serves the animal from its tenth to its twentieth year. The fifth molar, consisting of twenty lamellæ, is said to be in use for from thirty to forty years, so that the sixth molar, with its twenty to twenty-four lamellæ, does not erupt until about the sixtieth year, and has to serve for the rest of the animal's life. The number of lamellæ is, however, by no means absolutely constant, especially not in the fourth to the sixth molar; a deviation of one or two is quite common.

FIG. 2.



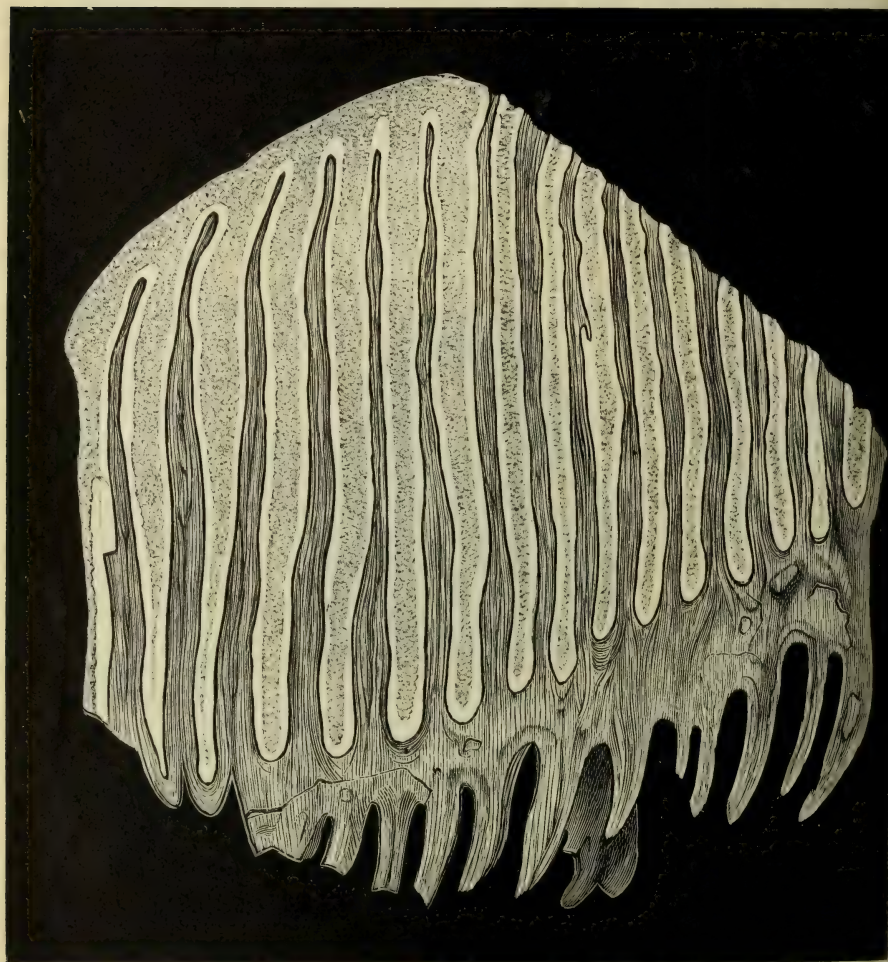
From molar of Indian elephant.

As the entire tooth is made up of a number of lamellæ, so each lamella begins its development in the form of four to eight finger-shaped formations (digital processes), which subsequently unite at their bases to form the lamella (Fig. 2). On grinding down a molar from the masticating surface, we first come upon islands of enamel, approximately circular in shape (Plate II, Fig. 18, *a*); on grinding further, the core of dentin makes its appearance, while still later on the separate digital processes have melted together and we have the fully formed plate.

The union of the separate lamellæ takes place by means of cement, which likewise surrounds the whole complex of lamellæ with a uniformly enveloping layer. The lower ends of the lamellæ are primarily separated from each other, but as soon as their longitudinal growth ceases the lower free margins of the neighboring enamel-walls of any two lamellæ unite and only the pulps and their common tooth-sac are able to go on forming the root. The formation of enamel, as far as the longitudinal growth is concerned, has ceased.

Provided the grinding-surface has not been worn down sufficiently to expose the dentin, the enamel will at this stage appear in form of a broad band, extending from one approximal surface to the other and folded upon itself twice for each plate in the tooth (Fig. 3). This union of the enamel of neighboring columns, plates,

FIG. 3.



Longitudinal section of molar of Indian elephant. (Two-thirds natural size.)

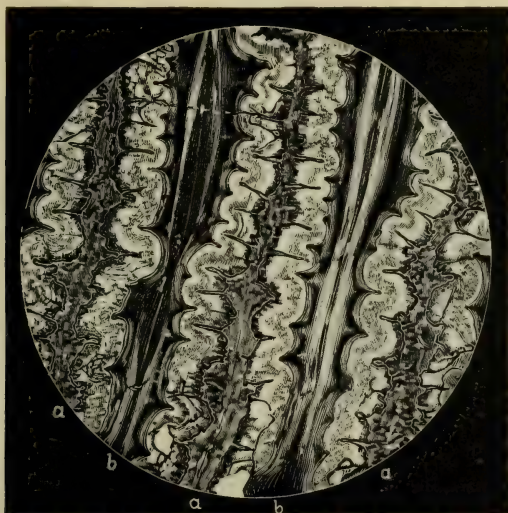
or cusps of compound teeth I have found to take place in all rooted teeth which I have examined. (Compare Plate II, Figs. 7, *a*, and 15, *d*.)

The united or basal portion of the pulps of all the lamellæ continues its work of dentin-formation, producing at the root end a continuous margin of dentin covered with cement, which extends

like a mantle over the lower ends of the united lamellæ. This mantle finally closes over them and grows out into root-like formations.

Röse figures two cases, in his "Zahnbau und Zahnwechsel von *Elephas indicus*," where the roots of the molar are partially devoid of cement. These were, however, in teeth not fully developed. The roots of the fully developed tooth, in all cases that I have examined, are entirely covered by a thin layer of cement. In regard to the minute anatomy of the molar of the Asiatic elephant, some points were brought out which have hitherto, so far as I am aware, not been noticed except in a short communication by myself and Dr. Dieck. Sections of the elephant's molar cutting the

FIG. 4.



Transverse section of molar of Indian elephant. *a*, cement; *b*, dentin showing thorn-like projections into enamel.

lamellæ transversely show how wonderfully the structure of the tooth adapts it to serve its purpose as an organ of mastication, and to resist the immense pressure to which it is subjected.

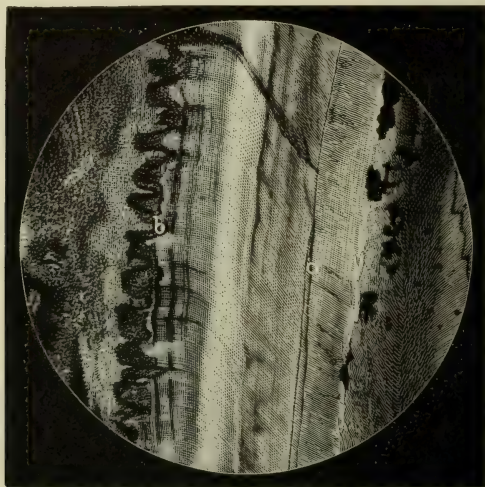
In human teeth, and, in fact, with but few exceptions, in all teeth, the enamel has no organic connection with the dentin, but is adapted mechanically only to its surface, from which it, in a dry condition, often breaks away on being subjected to but slight pressure.

In the molar of the elephant, both the dentin and cement possess numerous parallel ridges running the whole length of the plate, often widened at their free margins and extending sometimes as far as 5 mm. into the enamel, thereby binding the three tissues so firmly together that a separation is impossible. We accordingly seldom find cracks between the enamel and dentin in an elephant's molar. Fig. 4 and Plate I, Figs. 19 and 20, show these dentin and cement ridges cut at right angles, where they appear as thorn-like projections into the enamel, being very long and narrow in case of

the cement and for the most part short and thick in case of the dentin. The ridges number in both dentin and cement about twenty to twenty-five, which may be easily counted with the naked eye, while many more are visible under a slight magnifying power. They are present not only in the interlamellar cement, but also in that enveloping the surface of the tooth.

Sections made parallel to the sides of the tooth likewise show a remarkable structural feature, also subserving the same end of binding the tissues firmly together. While the margin between the dentin and enamel is here perfectly smooth, we find on the cement-dentin margin exceedingly numerous projections by which the two tissues are firmly locked together (Fig. 5, and Plate II, Fig. 6).

FIG. 5.



Longitudinal section of molar of Indian elephant. *a*, border between dentin and enamel; *b*, between cement and enamel.

If we dissolve out the enamel from a fragment of an elephant's molar by means of a strong acid solution, say, twenty per cent. hydrochloric acid, we find, besides the ridges referred to, the whole surface of the cement studded with projections little larger than the head of a pin, while the surface of the dentin from which the enamel has been dissolved away appears perfectly smooth.

My examinations were confined chiefly to the molar of the Asiatic elephant. I have had occasion to examine only one molar of the African elephant, in which these same structural peculiarities were present, though in a less degree.

Excepting in the molar of the elephant, I have nowhere met with a similar intricate union between the enamel and the dentin, while I have found it existing between the enamel and cement in the hippopotamus (Plate I, Figs. 3 and 17) and Phacochærus (wart-hog) (Plate I, Fig. 7). It may probably be found in other artiodactyla, where large masses of cement are present.

The square and lozenge-shaped figures resulting from the

peculiar arrangement and succession of the secondary curves of the dentinal tubules, and usually considered to be characteristic of the dentin of the tusk (see DENTAL COSMOS, 1890, p. 344), may also be found in the dentin of the molar where large masses of dentin are present, as is the case toward the roots of the tooth.

In the molar of *Hydrochœrus capibara* (gigantic water-cavy), shown in Plate I, Figs. 11 and 15, we likewise have a lamellated tooth presenting a certain resemblance to the molar of the Indian elephant, but in this case the lamellæ are simultaneously developed, and there is no particular bond of union between the enamel and dentin or cement similar to that described in the molar of the elephant. The cement never envelops the whole tooth, but unites the plates only in their median two-thirds, extending to within

FIG. 6.



Second and third lower molars of the warthog.

about one-quarter to one-third inch of their open (basal) ends. The plates have sharp edges, and are mostly slightly curved, sometimes /-shaped in cross-sections. The pulps of the separate plates remain separate, and no roots are formed. Likewise the convolutions marking the enamel-plates of the elephant's molar are wanting.

The molar of the warthog (*Phacochoerus*), of which sections are given in Plate I, Figs. 7, 10, 13, and Plate II, Fig. 7, is, to my mind, the most interesting tooth to be found among the whole class of mammals, or, in fact, anywhere, although in point of number of teeth and complexity of arrangement and distribution the greatest wonders are to be found among the fish.

In Fig. 6 we have a portion of the lower jaw of the *Phacochoerus*, in which the thin layer of bone has been chiseled away from the

lingual side to expose the second and third molars. It may be seen that the third molar increases to a remarkable degree in its antero-posterior diameter from the crown to the base, so that its removal would be utterly impossible without first chiseling off one of the plates. The external plate is several times thicker than the inner, and its removal for that reason less practicable. The tooth presents a marked contrast to the second molar in size and shape, and is imbedded to a remarkable depth in the jaw, being separated from the inferior plate of the jaw by a space only 2 to 3 mm. in width. In the case before us, the entire tooth is 6 cm. long, 4 cm. in antero-posterior diameter at the grinding-surface, 7 cm. at the basal end, and slightly over 1 cm. broad. It is made up of twenty-four columns of dentin, arranged in three rows, and being mostly approximately round in cross-section at the crown, but triangular or multifiform toward the basal end. Sometimes the conjoined walls of two external columns grow around an internal column. Each column is invested by a sheath of enamel reaching quite to the end. The tubes sometimes have a slight antero-posterior curvature, and the hindward tubes in particular are strongly curved laterally, so that it is impossible to obtain plane sections which cut the tubes through their whole length.

The whole compound tooth may be said to be made up of twenty-four single tubular teeth united together by cement, which not only fills up the interspaces between the columns, but envelops the whole tooth, as in the molar of the elephant and of ruminants in general, extending to within 5 to 10 mm. of the ends of the tubes. The pulp-chambers are long and narrow, extending to within about one-third inch of the morsal ends of the tubes. The foramina mostly remain wide open, as in teeth of perpetual growth, there being in the third molar but a slight tendency to the formation of roots. In the case before us, only the three anterior columns have united at the base to form a root-like appendage. In the second molar, four long, flat, or crescent-shaped roots are present. The tubular enamel-sheaths are closed at the morsal end, except where worn down by mastication, in which case round, oval, or triangular islands of dentin appear surrounded by a wall of raised enamel, while the interstices between the tubes, being filled out with cement, are likewise furrowed out. The whole surface has very much the appearance of a piece of mosaic.

The enamel edges of neighboring tubes sometimes unite at the basal ends in a manner similar to that described in connection with the molar of the elephant. I have found this, however, only where a tendency to root-formation was present, which would indicate a process perfectly analogous to that observed in the molar of the elephant, or, in fact, in all compound teeth where roots are formed. The cement is firmly interlocked with the enamel by means of processes similar to those described in the molar of the elephant and hippopotamus, but there is no characteristic bond of union between the dentin and enamel.

NOTE.—Preparations which have been overstained may, even after mounting, be reduced in color to any desired extent by exposing them to the direct

rays of the sun. This fact I learned by a chance which proved to be a very unfortunate one for me. In order to harden the balsam on the margin of the cover-glass I exposed about thirty of my large preparations to the sun, expecting to keep an eye on them and remove them at once in case any change in the color should be perceptible. I was, however, called away in a matter which kept my attention for nearly two hours, and when I finally thought of my sections I rushed to them to find that the majority of them as far as the color was concerned were almost completely ruined. The sections stained with thionin and eosin had scarcely a trace of color left, while those stained with triacid also suffered, but not quite to the same extent.

DESCRIPTION OF FIGURES.

PLATE I.

(Figs. 5 and 19 are cuts, all the others ground sections, of undecalcified tissue.)

Fig. 1. Upper first molar of horse. Triacid.

Fig. 2. Lower first molar of horse. Eosin.

Fig. 3. Small portion of margin of Fig. 17 (2×1), showing processes of cement extending into enamel. Triacid.

Fig. 4. Human molar with hypertrophy of cement (blue). Acid bath 2 min., thionin 24 hrs., eosin 2 min. (Compare text.)

Fig. 5. Dentin-scaffolding of upper molar of horse. Thionin-picric acid.

Fig. 6. Human canine, carious at *a*. Thionin-eosin.

Fig. 7. Cross-section of one of the columns of third molar of warthog (pulp deep blue, dentin violet, enamel unstained, cement blue), showing processes of cement extending into enamel. Thionin.

Fig. 8. Molar of ruminant by reflected light. Triacid.

Fig. 9. Upper first molar of horse. Thionin-picric acid. External cement blue, internal greenish blue, dentin violet, enamel white.

Fig. 10. Linguo-facial longitudinal section of third molar of warthog. Triacid.

Fig. 11. Upper fourth molar of *Hydrochærus capibara*. Cross-section. Thionin.

Fig. 12. Molar of ox. Cross-section. Thionin-picric acid.

Fig. 13. Lower third molar of warthog. Cross-section, showing twenty-six columns. Triacid.

Fig. 14. Human incisor. Cross-section of root and alveolus. *a*, bone; *b*, pericementum, which becomes much thinner and denser toward the lingual side; *c*, cement; *d*, dentin. Thionin-picric acid. (10×1 .)

Fig. 15. Cross-section of three plates of Fig. 11. *a*, dentin; *b*, enamel; *c*, cement. (8×1 .) Thionin.

Fig. 16. Section from crown of human tooth. *a*, caries of enamel beginning; *b*, enamel cuticle; *c*, dentin, with interglobular spaces blue. Thionin-eosin.

Fig. 17. Cross-section lower third molar of hippopotamus with the two pairs of half-cones and the fifth cone. Triacid.

Fig. 18. Section through upper human jaw. *a*, roots of first molar with hypertrophy of cement.

Fig. 19. Portion of cross-cut of decalcified molar of elephant. *a*, cement; *b*, dentin; intermediate celloidin. Thionin-picric acid.

Fig. 20. Portion of cross-section of molar of elephant. *a*, dentin; *b*, enamel; *c*, cement, showing how the three tissues are locked together. (Slightly magnified.) Triacid.

PLATE II.

Fig. 1. Transverse cut through molar of ox, after removing the enamel and dentin. Celloidin. Triacid.

Fig. 2. Cross-section of molar of porcupine. The enamel in this tooth, magnified 50 diameters, shows the decussation of the enamel prisms very beautifully. Triacid. (2×1 .)

Fig. 3. Horizontal section through the pharynx bone of Labrus (lipfish), cutting the teeth transversely. Thionin-picric acid.

Fig. 4. Cross-section of molar of young beaver. Thionin. (2 x 1.)

Fig. 5. Cross-section of molar of Paca (spotted cavy). Triacid. (2 x 1.)

Fig. 6. Portion of longitudinal section of molar of Indian elephant. *a*, enamel; *b*, cement; *c*, dentin. Triacid.

Fig. 7. Longitudinal section of lower third molar of warthog. *c*, enamel; *d*, cement; *e*, dentin. Triacid.

Fig. 8. Longitudinal section of human lower jaw. *a*, mental foramen; *b*, inferior dental canal; *c*, abscessed roots of first molar. Celloidin. Thionin-eosin.

Fig. 9. Cut through root of human tooth. *a*, cement; *b*, granular layer (stratum granulosum); *c*, dentin. Thionin-picric acid.

Fig. 10. Undecalcified section of bone. HCl 2 min., thionin 24 hrs., picric acid 15 seconds.

Fig. 11. Cut of human tooth with alveolus. *a*, periosteum; *b*, bone; *c*, pericementum; *d*, cement; *e*, granular layer (stratum granulosum); *f*, dentin. Triacid 1 min., thionin 3 min.

Fig. 12. Section from tusk of elephant, showing repair of gunshot wound. *a*, fragments of ivory driven into pulp; *b*, fissure resulting from contraction; *c*, *d*, ossific matter, consisting of osteo-, tubulo-, and vaso-dentin, subsequently deposited by the pulp and inclosing splinters of ivory.

Fig. 13. From molar of horse. *a*, dentin; *b*, enamel; *c*, cement with bloodvessels. Thionin-picric acid.

Fig. 14. Section through approximating human molars. *a*, caries of enamel; *b*, beginning decalcification of dentin; *c*, enamel cuticle with film; *d*, interglobular spaces. Thionin-eosin.

Fig. 15. Longitudinal section of molar of horse. *a*, enamel; *b*, cement; *c*, dentin.

Fig. 16. Cross-section through upper denture of rayfish. *a*, cartilaginous jaw; *b*, teeth. Thionin-picric acid.

Fig. 17. From one of the teeth in Fig. 16 under 50 diameters. *a*, vascular canals; *b*, radiating tubes, corresponding to the canaliculi of human teeth. Thionin-picric acid.

Fig. 18. Half of cross-section through molar of Indian elephant. *b*, cement; *c*, enamel; *d*, dentin. Triacid.

PORCELAIN.

BY GEO. H. WILSON, D.D.S., CLEVELAND, OHIO.

(Read before the Pennsylvania State Dental Society at Ligonier, July 9, 1901.)

THE use of porcelain for dental purposes originated in France in the eighteenth century, and was introduced into this country in the year 1817, by A. A. Plantou.

The dentist seems to have been greatly fascinated by this material, and we read of many experimenters in this work. Dr. Elias Wildman, of Philadelphia, perfected the composition of mineral teeth in 1838. We should revere the name of Dr. Wildman not only for his scientific attainments, but for the professional instincts that dominated the man. At this remote day he appears to have been remarkably free from that engrossing ambition to enrich himself at the expense of his professional brother, for his knowledge seems to have been freely given to the profession.

During the fourth decade Dr. John Allen, of Cincinnati, later of New York, perfected and introduced his continuous-gum methods. Much credit should be given to Dr. C. H. Land, of Detroit, for his long and persistent efforts in this line of work.

Credit for the present revival in the use of porcelain must be given to Dr. N. S. Jenkins, of Dresden, and our appreciation should be expressed to him for the great benefit thus rendered to esthetic dentistry. Dr. Jenkins claims to have produced a low-fusing material in which the tendency to become porous and change color in the mouth has been overcome. Is it not asking too much of a learned profession to accept a statement contrary to supposed facts, without giving a scientific reason for the assertion? The appearance of mysticism for commercial purposes should not be tolerated by any profession.

There are great possibilities in porcelain. I believe it has come to stay and fill a long-felt want in artistic dentistry. When the methods of its production and use are perfected it will be the *ne plus ultra* of all lovers of the harmonious in the "human face divine." The material and the methods of its employment are now so fully developed that every operator should be equipped and should perfect himself in its use. Much progress has been made, so that there is no justification, except in rare cases, for any one to place a gold crown upon the anterior teeth. I trust the day will soon come when every self-respecting person in both profession and laity will consider every perpetrator of such an abomination deserving of prosecution for malpractice.

There is no reason for expecting that a suitable low-fusing porcelain body will ever be attained, although it would be most desirable. The large majority of experienced workers of porcelain are satisfied that a medium high-fusing body is absolutely necessary. A material that will fuse at about the same temperature as Close's high-fusing body will answer every purpose.

It is the object of this paper to call attention to the composition of porcelain and glass; to the difference between high-fusing and low-fusing porcelain; also, why the low-fusing material becomes porous, and the very high-fusing porcelain is also porous, and only the high-fusing material is suitable for our work.

It has been remarked that there is no well-defined demarkation between porcelain and glass. They are both composed largely of silicic acid. Glass may be considered a transparent silicate of one or more bases, while porcelain may be considered an opaque silicate. This last would not be strictly true, as porcelain is not a chemical salt as is glass; it is more a mechanical mixture, a solidified suspension of two insoluble, infusible substances in a fusible silicate, which acts as a flux or bond and holds them together.

The purest qualities of porcelain are made from three mineral substances,—Quartz, Kaolin, and Feldspar. It so happens that these three minerals contain nothing but three oxids. Quartz is oxid of silicon or silicic acid; kaolin is the oxids of silicon and aluminum, the silicate of alumina; while feldspar is the double silicate of aluminum and potassium. It is to be noted that of the three oxids two are practically infusible, and insoluble in water, silica and alumina; one, potassa, is both very fusible and soluble. It follows as a natural sequence that two infusible, insoluble substances being combined by a very fusible and soluble material will be dis-

integrated by either heat or water just in the ratio of the quantity of the fusible and soluble substance.

Quartz is ground to an impalpable powder, and as its fusing-point is much higher than the temperature used in baking porcelain it remains unchanged and serves as the framework of the porcelain.

Kaolin gives the properties of toughness and opaqueness; when subjected to high heat it adheres to the framework, quartz, and parting with its water of hydration shrinks very badly. If we mix these two materials together and bake them at the ordinary temperature of baking porcelain, we will have an exceedingly porous mass resembling an unglazed brick.

Feldspar is a true chemical compound composed of silicic acid and the two bases alumina and potassa. This is, strictly speaking, a natural high-fusing glass. The feldspar fuses and forms a flux to solidly unite the particles of quartz and kaolin and fill all the spaces between the molecules of the mixture. The less flux used the higher the fusing-point and the less perfectly are the pores filled; consequently, the higher the fusing-point of the porcelain the more porous, and conversely, the lower the fusing-point the less porous.

Another cause of porosity is overheating the porcelain so that its constituents are decomposed, producing certain gases which are caught by the viscid flux, thereby injuring the porcelain. The inherent cause of porosity in the low-fusing porcelain is the large amount of potash or its equivalent, and therefore that which is soluble in the fluids of the mouth. This explains why a medium-fusing porcelain is the best for crown and inlay work.

Bloxam says, "Glass is defined chemically to be a mixture of two or more silicates, one of which is a silicate of an alkali, the other being a silicate of an oxid of calcium, barium, iron, lead, or zinc. If silicic acid be fused with an equal weight of carbonate of potash or soda, a transparent glassy mass is obtained, but this is slowly dissolved in water, and would therefore be incapable of resisting the action of the weather; if a small portion of lime, baryta, or the oxids of iron, lead, or zinc be added the glass becomes far less easily affected by atmospheric influences."

Liquid silix, sometimes called liquid or soluble glass, is sodium silicate; it is soluble in six volumes of hot water.

The author just quoted gives the composition of the various varieties of glass as follows: *Window-glass*—"Is essentially composed of silicate of soda and silicate of lime, containing one molecule (13 per cent.) of soda, one molecule (13 per cent.) of lime, and five molecules (69 per cent.) of silicic acid." *Plate-glass*—"Is a silicate of lime, soda, and potash." *Crown glass*—"Used for optical purposes, contains no soda, since that alkali has the property of imparting a greenish tint to glass, which is not the case with potash. This variety of glass, therefore, is prepared by fusing sand with carbonate of potash and chalk in such proportions that the glass may contain 22 per cent. of potash, 13 per cent. of lime, and 62 per cent. of silicic acid." *Flint glass*—"Used for table-glass and ornamental purposes, is a double silicate of potash and oxid of lead,

containing about 14 per cent. of potassa, 33 per cent. of oxid of lead, and 52 per cent. of silicic acid. The presence of oxid of lead very much increases the fusibility, and renders it much softer."

We will now consider the formulæ of porcelain as given in the "American Text-Book of Prosthetic Dentistry." We shall not mention the coloring matter, although that is feldspar, and often a flux with a small amount of metal or an oxid.

Hall's Molded Block Teeth.—Feldspar 1 oz., silica 80 gr., kaolin 27 gr.

Wildman's Carved Block Teeth.—Feldspar 1 oz., silica 80 gr., kaolin 30 gr.

Hall's Carved Block Teeth.—Feldspar 1 oz., silica 120 gr., kaolin 30 gr.

It will be noticed that Hall's molded block teeth and Wildman's carved block teeth only vary by three grains of kaolin, while Hall's carved teeth (block) have a large amount of silica. These bodies would be high-fusing.

The formulæ of the various continuous-gum bodies are interesting because they are medium high-fusing and will show what is used to produce the fusibility.

Continuous-Gum Formulæ of Dr. Hunter.—

Flux—Quartz 8 oz., calcined borax 4 oz., caustic potash 1 oz.

Granulated Body—Spar 2 oz., quartz $1\frac{1}{2}$ oz., kaolin $\frac{1}{2}$ oz.

Body—Flux 1 oz., granulated body $1\frac{1}{2}$ oz., asbestos 2 oz.

Gum Enamel—Flux 1 oz., spar 1 oz.

Formulæ of Dr. D. D. Smith.—

Granulated Body—Quartz 20 oz., spar 24 oz., caustic potash 1 oz.

Flux—Quartz 18 dwt., spar 10 dwt., glass of borax 2 oz., cryolite 1 oz., caustic potash 10 gr.

Gum Enamel—Flux 16 dwt., granulated body 11 dwt., cryolite 7 dwt.

Dr. John Allen's First Formulæ (out of use).—

Body—Quartz 2 parts, flint glass 1 part, borax 1 part, wedge-wood $1\frac{1}{2}$ part, asbestos 2 oz., spar 2 oz., kaolin 1 oz.

Gum Enamel—Spar $1\frac{1}{2}$ oz., white glass 1 oz.

Dr. Ambler Tees's Formulæ.—

Flux—Silica 12 oz., borax 3 oz., potassium carbonate 3 oz.

Body—Feldspar 40 dwt., flux 9 dwt., kaolin 3 dwt.

Enamel—Feldspar 40 dwt., flux 12 dwt.

From the study of these formulæ we see that all the higher-fusing bodies are composed of feldspar, silica, and kaolin, while the lower-fusing bodies contain the same with an additional amount of alkali. As they are fusible just in the ratio of the amount of alkali, we are justified in concluding that they are soluble just in the ratio of the degree of fusibility. Hence the low-fusing porcelain, containing a large amount of alkali, is not suitable for dental use. The kaolin or clay is formed in nature's laboratory by the action of frost and water in breaking up the feldspar rock and dissolving the potash. We know that a hard glazed surface will re-

sist a reagent much longer than a rough or porous surface. Hence we infer that porcelain, though it may be highly charged with an alkali, will resist the fluids of the mouth much better if it has a highly glazed surface. This we find is true without an exception with the low-fusing bodies. As they come from the furnace they may resist the fluids of the mouth for a long time, but if they are ground and polished they will be more or less quickly disintegrated.

We may consider porcelain as an unfused glass, for it is true that all porcelain if subjected to a sufficiently high temperature will be converted into a transparent glass. Hence it is essential that porcelain be not overfused.

There are two general methods of manipulating porcelain. One is to have a body which is baked to a biscuit, then glazed with a lower-fusing enamel; the other is to have all the ingredients incorporated into one mass and equally fused. The first method makes true porcelain, while the second partakes of the nature of glass. We quote the following from an article by Quintin Miller, L.D.S. Eng., published in the May number (1900) of the *Journal of the British Dental Association*:

"The one class we may call poured teeth, as the material is run, in a liquid state, into the mold; the other we may call molded teeth, as each part of the tooth is put by hand into the actual part of the mold desired.

"The constituents are in either case—

"(a) The enamel—nearly all feldspar, with perhaps a very little silica.

"(b) The body—containing feldspar, with more silica than is in the enamel, and in some cases a small quantity of China clay. It is present, I believe, in small quantities in most American teeth, and its effect is very much the same as that of silica,—to neutralize the excessive blueness of the feldspar and give strength and opacity to the body of the tooth. The principal English manufacturers notably use more silica than the American, hence they turn out a whiter and harder tooth. . . .

"In the case of the poured teeth, a small quantity of the body is taken and mixed with a proper proportion of the desired colors, then a due proportion of enamel is taken, and the whole is mixed together and poured into the molds. The principle underlying the making of these poured teeth is the fact that if two or more powders of varying degrees of fineness be mixed in water and allowed to settle, the coarser goes to the bottom and the finer remains at the top. . . . Teeth made after this method certainly possess the advantage of being more dense than molded teeth, and this is a quality which we are at times very glad to avail ourselves of, when we desire to shape and polish them, but as to how much this greater density and hardness is due to the pouring, and how much to the extra silica that makers of poured teeth use, I cannot say. Useful as this quality is, however, I am doubtful whether it is not more than counterbalanced by the uncertain distribution of color, and the impossibility of an anatomical placing of the enamel in its proper relation to the matrix or body of the tooth.

"Everything depends, of course, on whether the different constituents will settle correctly into the desired positions, and whether there will be the gradual blending of the body into the enamel toward the tip of the tooth; of course, if the molds are poured from the tip of the tooth, the enamel must be finer than the body, and if from the neck, *vice versa*. With the greatest care exercised in the grinding of the materials, much depends on chance."

I have quoted at some length from Mr. Miller's article because it is the only description I remember to have seen of the method of manufacture of English teeth; however, I must take exception to some of his statements.

First: "Enamel contains feldspar with perhaps a little silica." It is probably flux in place of silica, especially in the English teeth. This can be demonstrated by fusing an English tooth and feldspar side by side, which will show that the tooth fuses at the lower temperature.

Second: "The principal English manufacturers notably use more silica than the American, hence they turn out a harder and whiter tooth." It is very doubtful about there being as much silica in English teeth as in the American, which is shown by the low fusibility of the English compared with the high-fusing American teeth. The peculiar whiteness he complains of is probably due to the inherent qualities of the feldspar used, or the excessive grinding of the spar. He seems to have confounded the term density with hardness. The English teeth are more dense because of their homogeneous and glass-like nature, while the American teeth are of the nature of porcelain. The English tooth grinds and polishes with much less labor than the high-fusing American tooth, demonstrating that it is of softer nature.

Again, he states that the pouring method produces a more dense tooth than the molded. It is not possible for a powdered mass to settle in water into a more dense mass than the same powdered mass can be made with slight moisture and heavy pressure.

The molded teeth are subjected to heavy screw pressure. The difference in density is due to the composition of the material and not to the manner of shaping the substance.

Another characteristic difference between the poured and molded teeth should be borne in mind; that is, the difference in refraction. The molded teeth reflect the light, while the poured teeth absorb the light; hence in an artificial light the poured teeth will appear dead, which is not the case with the molded teeth.

Without arguing all the points I believe we are justified in assuming the following statements to be true:

First. That the prime difference between glass and porcelain is the degree of fusion.

Second. That fusibility is due to the amount of alkali contained.

Third. That porosity is due to three causes: (a) The structure of high-fusing porcelain. (b) The overheating of any porcelain or glass. (c) The solution of the alkali in low-fusing porcelain or glass.

Fourth. That porcelain bodies are stronger and more resisting than enamels.

Fifth. That the highest-fusing dense material is the best for all dental operations.

Sixth. That all porcelain work should be constructed of body and enamel. Especially true of plates, bridges, crowns, and large inlays.

NIRVANIN AS A LOCAL ANESTHETIC.

BY D. H. ZIEGLER, D.D.S., CLEVELAND, OHIO.

(Read before the Cleveland Dental Society.)

At the beginning of the twentieth century, with all the applied sciences and physiological methods used in studying new drugs, which are presented to us in the minutest detail of their action, is it not well for us to consider them and satisfy our own mind whether they can replace the remedies which were handed down to us by our preceptors and college professors? While it is true that many of us are not in a position to carry on research work, yet, even under the most trying circumstances, it is surprising how much can be learned by applying a few minutes each day to a particular subject.

When I was requested to present a paper before this society, I felt like presenting a few original facts. In looking around for a subject, I decided to carry on a line of experiments with one of the new local anesthetics, and give my results in a short paper. So this evening I present to you for your criticism the drug *nirvanin*.

Nirvanin is the hydrochlorid of di-ethyl-glycocyl-amido-oxybenzoic methyl-ester. It appears as a white crystalline powder, having somewhat the taste of potassium iodid; melts at 185° C.; is very soluble in hot or cold water, and in alcohol. It also comes in one-grain tablets. The aqueous solution is neutral, non-irritating, non-toxic; when used hypodermically it is unaccompanied by unpleasant effects or by after-effects, so often experienced with cocain.

The solution should be made in distilled water, or, better, in normal salt solution. It is in itself bactericidal, even in so weak a solution as one per cent.; heat does not affect its action. One grain in twenty minims of water will make a five per cent. solution. Normal salt solution is made by dissolving a teaspoonful of pure salt in a pint of sterilized water.

Nirvanin will not produce anesthesia unless applied to abraded surfaces or used hypodermically. When so used, I am convinced that the anesthesia is as profound and much more prolonged than that produced by cocain.

We are all too well acquainted with cocain; therefore it may not be necessary to point out the toxic effect so often resulting from its use, but I will touch on it later in the paper. In the hands of a careful and competent operator, cocain meets with good success, but, in spite of precautions, patients often complain of faintness, etc. In cases of inflammation, cocain should never be used, while

nirvanin can be injected into inflamed tissues without any serious result.

Dr. Bonnard, of Paris, after experimenting with animals, claims that nirvanin is fifteen times less poisonous than cocain. Patients subjected to its influence are free from attacks of vertigo, and wounds heal rapidly and easily.

The first experiment was on myself. I injected twenty minims of a five per cent. solution in my forearm. The first five minims I injected rapidly, and it caused a very unpleasant burning sensation; the balance was injected slowly, and caused no pain. In three minutes' time there was still a slight sensation; at the end of five minutes there was perfect anesthesia from one-quarter to one and one-half inches around the point of injection. This was demonstrated by running a sharp needle into the flesh. At the end of fifteen minutes sensation became perceptible, and in eighteen minutes the effect had passed off. During this time I noticed no change in respiration or in the heart's action. In making my deductions, I am convinced that a minor operation lasting twelve minutes could have been performed without any discomfort. But all day my arm had a heavy feeling, and when I retired at night was still swollen around the point of injection; but no pain was connected with it.

Case No. 1. That same morning a boy fourteen years of age presented himself with an alveolar abscess; lips and cheek greatly infiltrated; upper lip swollen to three times its normal size. After opening the tooth, I lanced the tissue and caused the young man considerable pain. I decided to make another incision, and injected eight minims of a five per cent. solution. At the end of eight minutes I made my second incision; perfectly painless; wound healed nicely, and no ill effects.

Case No. 2. A man thirty-eight years of age; tissue firm and hard; first and second bicuspid roots broken down beneath the free margin of the gum. Injected twenty minims of a five per cent. solution. Complained of considerable pain while injecting, which I attribute to too rapid injection. At the end of five minutes a student removed the roots, and also a considerable portion of the alveolus. The patient was greatly excited during the operation, but said that he felt no acute pain. He had several other teeth to be extracted, and requested that they be removed without an anesthetic.

Case No. 3. A girl sixteen years of age, with inferior first molar and second molar to be extracted. Injected fifteen minims of a five per cent. solution. Six and one-half minutes afterward the teeth were removed, and she remarked, "That is great stuff!" There was no pain during injection, and positively no after-effect. I saw the patient two days after the operation; wounds were healing nicely; no signs of inflammation.

Case No. 4. Woman thirty-five years of age; upper right first and third molars. One of the students injected twenty minims of a five per cent. solution around both teeth. At the end of three minutes he removed the first molar, and the patient complained of

some pain. I attribute this failure to want of time, which will be demonstrated by the operation on the third molar; after making three failures on this tooth, Dr. Hurd finally removed it without any discomfort to the patient. This was ten minutes after the injection.

Case No. 5. Man forty-two years of age, with impacted canine. Injected twelve minims of a five per cent solution. At the expiration of four and one-half minutes I removed the tooth, to the patient's entire satisfaction. He remarked that it would not be an ordeal to have a whole mouthful of teeth extracted under those circumstances.

Case No. 6. Man forty-five years of age, with an abscess on the roots of an upper first molar. I decided to make an artificial fistula. Injected twelve minims of a five per cent. solution. Five minutes afterward I laid open the gums without any pain, but before I drilled through the bone I caused the patient some pain. Later I performed a similar operation on a woman; it was perfectly painless.

Case No. 7. Girl aged ten, with lower first molar. The little patient was very nervous, and I had considerable difficulty to keep her quiet long enough to make an injection of eight minims. After an interval of six minutes, the tooth was removed without a struggle or outcry on the part of the patient, but she claimed it pained her slightly. I am perfectly convinced that this operation was as nearly painless as an operation could be under a local anesthetic; had it been otherwise, considering her nervous condition, she would have made a decided struggle.

Case No. 8. Woman thirty-five years of age. Upper second molar roots; gums firm and dense. Injected twelve minims of a five per cent. solution. At the expiration of six minutes we lanced the gums, and removed the roots without the slightest discomfort.

Case No. 9. Man forty-five years of age, on whom we had used cocain on a previous occasion with no success. Injected twenty-five minims around the roots of the first and second bicuspids, first, second, and third molars; gums were highly inflamed. Five minutes afterward a student began to operate, and spent ten minutes in removing the roots. After the operation the patient made another appointment to have other teeth removed, and requested that the same solution should be used, claiming the operation to be perfectly painless.

Case No. 10. Man thirty-one years of age, with upper right and left third molars to be extracted. Injected fifteen minims. Five minutes later the teeth were removed. Patient remarked, "Never felt a thing."

Case No. 11. Woman thirty-eight years of age. Lower third molar. Injected ten minims. After the usual five minutes, the tooth was removed without the slightest pain.

In presenting these cases, you will notice that I have not reported an absolute failure. Yet we have not been successful in every case, but where the results were not satisfactory, it was entirely due to want of time. I find that the injection must be made very slowly,

and from five to six minutes must be allowed to produce perfect anesthesia. All operations that were performed immediately after injection, or up to three minutes afterward, were not a success. I have used it to remove pulps with the spunk method, and the results were all that one would wish.

We now come to one of the most important points; that is, the possible danger of the new remedy for the patient as compared with cocain.

Certain persons possess an idiosyncrasy to cocain which cannot be foreseen. It exerts its toxic effects upon the nervous centers and, secondarily, upon the heart. The danger is mainly from paralysis of the heart. By experiments upon animals, it is shown that small doses cause a decrease of the pulse-rate, while a moderate dose causes an increase; a large dose always causes a more or less permanent decrease. The cardiac inhibitory centers are always affected, being primarily stimulated and secondarily depressed. The arterial pressure is always increased, which is due to stimulation of the vasomotor center in the medulla oblongata. The maximum dose of cocain is supposed to be 0.05 gm. (or 0.7 gr.). As a matter of fact, toxic symptoms have been observed in considerably smaller doses by all who have ever used cocain extensively. I have seen an apparently strong woman pass into a state of collapse, which lasted nearly an hour, after the injection of ten minims of a two and a half per cent. solution, which is equal to one-fourth of a grain.

By studying the physiological action of this drug, one can readily see the necessity of great precaution in its use. I never injected it without a fear of its toxic effect. I would no more think of using it without a stimulant at hand to counteract its action than I would of giving a patient an overdose of strychnin.

But in dealing with this new drug we are not free from toxic symptoms; all experiments, however, show it to be from ten to fifteen times less toxic than cocain. I had expected to present to this society a blood-pressure tracing of its effect on the mammalian heart, but, unfortunately, I was unable to finish the experiment. The following tabulation will show the physiological action when applied directly to the frog's heart:

Experiment 1. Solution 1 : 10:

Before application the rate of the beat was 18. At 9.02½ A.M., on the application of a ten per cent. solution, the contraction or systole at once became very much stronger, but immediately decreased at 9.08½. Two minutes after the application the rate dropped to 7, and the heart became very pale. At 9.09½ it stopped in the median position; by mechanical stimulation it gave a very weak contraction. At 9.10 it was washed off with salt solution; no reaction to mechanical irritation; muscles very white.

From the above we observe that, after a short primary stimulation, the drug causes a rapid paralysis of the cardiac muscles; shown by slowing and weakening, the automatic beat being arrested in three minutes and excitability being lost in three and one-half minutes.

Experiment 2. Solution 1 : 100:

(a) Rate 19. At 9.17 the solution was applied; the beat was immediately strengthened, which effect passed off at once, the heart becoming weaker and the systole being lessened; at 9.19 the rate had dropped to 11, and the beats were very weak. At 9.21 it dropped to 6. It was then washed off with salt solution and laid aside; at 9.22 it stopped entirely, but gave a fairly strong beat to each mechanical stimulation; at 9.26 no response to mechanical irritation; heart very pale.

(b) Heart-beat 18. At 9.24, on application of solution the efficiency of the beat is increased; both diastole and systole are increased in extent, but quickly become lessened in efficiency; at 9.28 the rate had dropped to 10, and at 9.43, or nineteen minutes after the first application, the heart stopped in the median position, but gave a single beat to mechanical stimulation; at 10.15 the auricles contract, but not the ventricles, to mechanical irritation. At 10.22 same result.

(c) Rate 12. At 9.40 the solution was applied; efficiency of the beat increased, but at once lessened; at 9.45 the rate dropped to 10, and at 9.55 the heart stopped in median position; no response to mechanical irritation.

Under these three experiments we observe the same phenomena as in experiment 1; after a brief primary stimulation the solution causes a rapid paralysis. The paralysis is complete in five to eighteen minutes, the ventricle stopping before the auricle.

Experiment 3. Solution 1 : 1000:

(a) Rate 22. At 9.55 the solution was applied; the heart-beat increased, but disappeared after each application; at 10.08 the rate dropped to 20, the beat appeared slightly weaker; by 10.30 it had decreased to 18; this rate was maintained until 11.03, when it again increased to 21. At 11.40, at the close of the experiment, the rate was still 21, or one less than at the beginning of the experiment.

(b) Rate 27. At 10.10 the solution was applied; the heart-beats became faster and stronger, which character disappears after each application; at 10.32 the rate had dropped to 21, beat slightly weaker; at 11.10 the rate had increased to 24; by applying the solution it again fell to 21; this rate was maintained to the close of the experiment, at 11.37.

(c) Rate 24. At 10.25, on application of the solution the heart-beat increased in rate, but quickly lessened; at 10.35 it dropped to 16; by 11.06 the rate had increased again to 18; by applying the solution it immediately dropped to 16, but showed no further decrease.

With these three experiments (solution 1 : 1000) we observe with each application a short temporary increase of rate and strength of the heart; after a short time the rate is reduced (to two-thirds) and somewhat weakened, but no further weakening occurs in one and three-quarter hours.

Experiment 4. Solution 1 : 10,000:

(a) Rate 19. At 10.45 the solution was applied; beat increased, but at once lessened; 10.55, rate 18; 11.15, rate 18; 11.30, rate 19.

(b) Rate 28. At 11, on application of solution, we have the usual increase. 11.04, rate 28; 11.34, rate 24.

(c) At 11.20, rate 30; at 11.35, or fifteen minutes later, rate showed no decrease.

Experiment 5. Solution 1 : 5000. (Same frogs that were used in experiment 4) :

(a) At 11.30, rate 19; 11.40, rate 18.

(b) At 11.34, rate 24; 11.45, rate 21.

(c) At 11.35, rate 30; 11.46, rate 29.

Thus in three experiments with a solution of 1 : 5000 and in three with 1 : 10,000, the drug caused a slight temporary stimulation without any weakening.

From these thirteen experiments we see that the immediate effect is a slight, very short stimulation. This may probably be referred to chemical stimulation of the heart muscles, and would probably not occur if the solution were not applied directly.

The further phenomena are typical of paralysis of the cardiac muscle. This begins to appear, but does not become complete, with 1 : 1000 solution. 1 : 100 arrests the heart in about fifteen minutes.

The drug, therefore, does have a paralyzing effect on the cardiac muscle, *if directly applied*, and therefore cannot be considered devoid of all danger from this source. However, the concentration required is so great that under ordinary conditions (as in man) it would scarcely be considered to exert this action. Taking it for granted that it will have the same effect on the mammalian heart, it cannot be considered a dangerous drug in the amount used for minor operations.

The results in the following series of experiments will show the amount of nirvanin required to produce intoxication with a guinea-pig weighing eight ounces:

Experiment 1. At 2.10, injected $\frac{1}{4}$ gr.; same injection at 2.30, 2.50, 3.10, 3.30, and 3.50.

By injecting $\frac{1}{4}$ gr. every twenty minutes there was no sign of toxic symptoms until 3.55, or until the animal had $1\frac{1}{2}$ grs. in one hour and forty minutes. The first sign of intoxication was manifested by a slight tremor throughout the whole body; this was immediately followed by a loss of control of the centers of equilibrium. In attempting to walk, the animal staggered, and at 3.58 was no longer able to remain on its feet. Every effort that was made to obtain an upright position resulted in falling over on the right side. At this time the heart seemed fairly good, but somewhat depressed; respiration did not appear to be affected, and pupillary reflex was as under normal conditions. Following this stage, the animal rolled over on its side and went into convulsions, followed by slight spasms. This condition was kept up for ten minutes, when another effort was made to gain its feet, and with success, but it was still unable to walk. From this time on the animal rapidly recovered, and at 4.35 appeared to be in a normal condition. When placed in its box, it immediately began to eat.

Experiment 2. Injected $\frac{1}{2}$ gr. with no result.

Experiment 3. Injected 1 gr. Four minutes later intoxication took place, with same symptoms as in experiment 1.

Experiment 4. Injected $\frac{3}{4}$ gr. Result same as in experiments 1 and 3, but in a milder form.

Experiment 5. Injected 12 minims, or $\frac{3}{8}$ gr. Result negative.

(Experiments 4 and 5 were repeated on various occasions, results being always the same.)

These experiments show the minimum toxic dose for an animal weighing eight ounces to be $\frac{3}{4}$ gr. However, if this amount is injected during a period of forty minutes, no toxic effects are produced. We may now compare this with the toxic dose of cocain, as follows:

Reports show that 0.3 gr. of cocain acts as a toxic dose on an animal weighing 2.2 pounds, which implies that 15 grs. is a toxic dose for a man weighing 50 kilos, or 110 pounds; but the maximum toxic dose given in the *materia medica* is 0.7 gr., which is the one-twentieth part of the above.

Taking this as our standard, we have the toxic dose of nirvanin for a man weighing 110 pounds, 165 grs.; and the one-twentieth part of this would be 8 grs. This is one grain above what the manufacturers claim to be the toxic dose.

While I do not claim to have discovered the exact amount of the drug that would produce intoxication, yet I am convinced that it is not placed too high.

The question naturally presents itself, Have we a drug that can replace cocain? If 0.7 gr. of the latter produces toxic symptoms, and if it requires 7 grs. of nirvanin to produce the same effect, we must, without a doubt, give nirvanin our preference. As to its anesthetic properties, I am thoroughly convinced that it will do all that cocain can do, and under certain conditions more; so that in my mind there is no argument in favor of cocain. In the practice of dentistry we owe to ourselves, to the profession at large, and to our patients an interchange of knowledge, observation, and experience; so that if observation teaches us to alleviate pain without submitting our patients to any unnecessary discomfort, it is our duty to do so.

In closing, I wish to express my thanks to Dr. Solomon, professor of pharmacology at the Western Reserve Medical College, for the use of his laboratory and for his kindly assistance; also to Dr. C. E. Hurd for the interest which he displayed, and the assistance which he gave me in its use at the Dental College clinic.

HYPERTROPHY OF THE GUMS—CONTINUED:

INCLUDING SURGICAL TREATMENT OF CASE NO. 2, REPORTED IN DENTAL COSMOS, APRIL, 1901, EXAMINATION OF TISSUES REMOVED, RESULTS OF OPERATION, AND CONDITION OF PATIENT TO DATE.

BY W. J. ROE, M.D., D.D.S., PHILADELPHIA.

(Read before the Pennsylvania State Dental Society at Ligonier, July 9, 1901.)

Operation, July 25, 1900.—The gums were carefully sprayed with hydrogen dioxid at intervals of two hours during the two preceding days. Ether was administered. Beginning on the right

half of the mandible and at the ramus, I made an incision through the mucous membrane and periosteum, extending on the labial surface to the median line, and upon the lingual surface to the canine tooth, and a little distance from the hypertrophied gum. With a periosteal elevator the gums were readily detached from the alveolar process, taking with it the two roots of the first molar, which were firmly held in the hypertrophied gum-tissue, leaving their sockets perfectly clean. The bone was firm, showing no evidence of involvement. The gums of the right maxilla were then removed in a similar manner, the labial incision ending in the median line, and the palatal at the canine tooth. The second molar, which was carious, and second bicuspid, which was loose and carried downward, did not come away with the gum-tissue, but I afterward extracted them, as the alveolar process had been greatly absorbed, leaving not more than one-third of their roots covered. The same procedure was carried out upon the gums of the left superior maxilla and left half of the mandible, except that no teeth were removed. There was considerable hemorrhage, which was readily controlled by pressure with gauze sponges, and the denuded bone was dry at the termination of the operation.

About one hour later, quite severe reactionary hemorrhage began, and Dr. Kennedy, the resident physician, made local applications of the following agents in the order given, with but little success: hot water, solutions of alum, suprarenal extract, and Monsel's, after which he made continuous pressure by means of gauze sponges and his fingers, for a considerable time, which controlled and stopped the hemorrhage. Constitutional evidence of the loss of blood was manifest in pallor, sweating, and compressible pulse, which increased to 140. On July 28 the patient was discharged from the hospital, not having had any pain since the operation, the wound surface being in excellent condition and covered with healthy granulation.

Report of Dr. John Funk: Examination of Tissue Removed at the Operation.—The first portion of the hypertrophied gum removed was immediately incised, and spreads were made from the freshly cut surfaces; inoculations were made from these surfaces upon agar-agar and bouillon, also pieces of the tissue were macerated in bouillon by Dr. Randall C. Rosenberger. The cover-glass spreads were stained by Weigert's method. Microscopical examination revealed numerous yeast-cells. The cultures failed to reveal the growth of the yeast fungus, but showed various bacteria commonly found in the oral cavity. Pieces of the tissue from the various portions were fixed and sections were prepared as described in previous report.

Histological Examination.—One surface is covered with a layer of squamous epithelial cells, which were apparently normal. The opposite surface is composed of a dense layer of fibrous connective tissue, which apparently is the periosteum. The structure between the epithelial layer and the periosteum is composed of fibrous connective tissue and comprises at least four-fifths of the entire section. This layer corresponds to the second layer described

in the previous report, but cannot be divided into two parts, as was that layer, since the fibrous tissue is uniform in density throughout and contains fewer cells than the second layer in the previous report. This specimen differs from the one previously examined as follows: There is a marked increase in the quantity and density of the fibrous tissue, and a great diminution of the number of cells, which is probably due to a transformation of the various cells in the first specimen into fibrous tissue.

Results of Operation, and Condition of Patient to Date.—For the following five months I saw the patient once each week. The reformation of the gums in the molar and bicuspid regions was apparently perfectly normal, but, in the region of the anterior six teeth, especially the upper, it appeared abnormally thick and slightly lobular.

On December 20 I removed for histological examination a piece of this gum-tissue, and Dr. Funk reported that the specimen showed practically the same histological condition as did the first specimen examined, excepting in one important particular, *i.e.*, the absence of yeast-cells.

Since then until the present time I have observed the patient at intervals of two weeks, and the apparent thickening of the gums, instead of increasing, has slightly decreased. The absence of the yeast-cells and the cessation, and slight diminution, of growth argue strongly against this being a recurrence, and until positive evidence is adduced I shall not consider it as such nor institute further treatment.

SCIENCE AS A TEACHER OF PROPHYLAXIS.

BY SAMUEL A. HOPKINS, M.D., D.D.S., BOSTON, MASS.

(Read before the Massachusetts Dental Society, June 5, 1901.)

MR. PRESIDENT AND MEMBERS OF THE MASSACHUSETTS DENTAL SOCIETY: I am not unmindful of the compliment paid me when you invited me to address you. So great an honor might easily embarrass one more fitted for the task which I have assumed. What, then, can I say that will make you feel that this hour has not been spent in vain? What message can I bring to you that will inspire you with hope and with high aspirations in your professional life? What thought can I express that will help to remove from your professional pathway the stones which bruise your feet and the obstacles which obstruct your progress?

I regret that I cannot bring to you a strictly scientific paper, rich with the results of laboratory investigation,—a paper that would help to clear up some of the mysteries which blind us in our efforts to ameliorate the suffering of mankind. But the time for preparation was short, inasmuch as your secretary's invitation came at a period when, owing to outside pressure, my research work was sadly neglected. Still I hope that I may be able to gather together the thoughts of others and clothe them in a dress sufficiently attractive to awaken your interest.

The marvelous ingenuity shown by many of my associates in dentistry, the wonderful skill displayed in the dental operations of to-day, cannot be surpassed by the best that exists in any art or profession that the world has ever known. The delicate skill shown in the surgeon's most triumphant operation is exercised in the daily routine of the dentist's life. So high has the mechanical and manipulative skill in dentistry been carried that one has grave doubts as to whether further progress can be made in this direction. I do not speak of individual progress, for I have personal knowledge of at least one individual who has still much to acquire in this direction; but it seems to me that if the profession is to make such advancement in the century to come as has distinguished it in the century just passed, it must be along other lines. The acme of operative skill must have been reached when it can be asserted that a tooth is better after a certain kind of filling has been inserted than it could be in its normal, healthy condition. And yet I have heard this statement made and go unchallenged in one of our leading dental societies within the last few months. Operative skill can go no further than this.

As I sat through that meeting and examined the remarkable results achieved by this clever man (results perhaps that few of us can hope to obtain),—wonderful contour fillings, restoration of teeth by beautiful crowns and bridges, remarkable results in regulating, and other splendid examples of manipulative skill,—I could not help wondering wherein it was possible for improvement to be made. And then the thought came to me: suppose that it had been possible to have prevented the necessity for those enormous contour fillings; suppose our knowledge could have kept those lost teeth in the head and have kept the dead teeth alive; would not that have been still greater progress and redounded still more to the credit of the profession?

I am thankful that I belong to a profession that is willing to do what it can to abolish the need for its existence; a profession that is laboring conscientiously to cut off the sources of its income by adopting prevention instead of cure. Should the marvelous elixir be discovered to-morrow by which teeth could be preserved and dentistry rendered a lost art, there is not a man in this room who would not blazon the knowledge to the world, store his office furniture in his garret, and go out and look for another occupation. With the possible exception of medicine, there is no other calling in the world wherein such unselfish devotion to the needs of humanity is constantly practiced.

Let us see, then, how we can best use the facts which have been revealed to us by science to prevent the diseases which we are now called upon to treat.

The study of human histology, pathology, bacteriology, and kindred sciences has for its object the improvement of the human structure, the prevention of disease, and the discovery of prompt and effective measures for the relief and cure of diseased conditions when they occur. Any other object would be a prostitution of science. That the object of research work in these departments is

sometimes lost sight of by enthusiastic workers cannot be denied. Rarely does the trained pathologist working over some morbid specimen in his laboratory give thought to the bearing of his work upon the cure of disease. As he studies the polynuclear cells in some interesting tumor, suffering humanity is forgotten and the advancement of scientific knowledge alone is uppermost in his mind. Well may the faithful practitioner exclaim, "What to me is this wonderful knowledge if I cannot apply it to the relief of human suffering?" The intense, practical mind chafes under the delay which postpones the application of scientific knowledge until after he is dead. Short cuts are his delight, and if they are filled with obstacles, and if he comes a cropper at every fence, he picks up and goes on satisfied if he can be in at the death and capture the object of his pursuit.

The accumulation of scientific facts, however, can never be in vain, and though the relation of such knowledge to practical affairs may not be immediately shown, nevertheless the time will come when its value will be recognized and turned to account. The laying of the Atlantic cable was made possible by a mathematical demonstration discovered a hundred years before which had never been utilized in practical work up to that time.

As I shall have occasion to speak of the work of several scientific men and quote from the writings of others, I must preface my remarks by saying that I hope that nothing I may say will provoke controversy. The time wasted in useless controversy would go far toward advancing human knowledge, and the space devoted to such matter in our dental journals in the past few years would suffice for a very good *résumé* of all dental knowledge. Let me say that I shall speak of no one whose work I do not respect, and if I do not indorse every detail of the work I refer to, it will reflect neither upon the honesty nor the intelligence of those who did it.

About twenty years ago, W. D. Miller, of Berlin, gave to us the theory that acid-producing bacteria caused dental caries. The bacteria found their nutrition in particles of food, in broken-down epithelial cells, and in other waste products of the mouth. They found a degree of moisture to their liking, and a temperature best suited to their rapid growth. Under these conditions, they produced an acid which dissolved out the lime-salts and caused the breaking down of the enamel. It can be easily demonstrated that this acid is lactic acid, and, so far as it relates to the destruction of enamel, Miller's theory remains unquestioned. It is enough for our purpose to know how the enamel is destroyed so that our prophylactic treatment may begin at that point, for if we can check the process in enamel it will make little difference what takes place in the dentin. The remedy seemed simple. We argued, "If the cause is an acid, the remedy must be an alkaline tooth-wash." But here at the outset we find ourselves confronted with another condition,—viz, that these acid-producing bacteria multiply most rapidly in an alkaline media, and stop growing when the media in which they live becomes acid and reaches the strength of one-half of one per cent., or thereabouts. They are victims of their own

industry, and are killed by the acid which they produce. You will find that the saliva of those patients in whose mouths the process of caries is going on most rapidly is uniformly alkaline. Acid saliva, which is extremely rare, is not an accompaniment of caries, and who is there who has found in an alkaline tooth-wash, useful though such a preparation may be, the much-sought-after agent that will eliminate caries from the catalogue of human ills?

If you will follow a few simple experiments that I have remade, you can perhaps get a glimmer of light on this puzzling question. If you will take pieces of sound tooth and put them in a test tube with a little distilled water, you can introduce any and all the bacteria from the mouth; you can even introduce bits of decayed dentin, and at the end of a few months, kept all this time at the temperature of the body, you will find that the bacteria have diminished and nearly disappeared, and that the contents of the tube have not become acid. The sound pieces of tooth have remained unchanged. If, however, you perform the same experiment with the addition of starchy or saccharine food, renewing the mixture every week, you will find that an acid will be produced and that the teeth will show marks of carious action. This demonstrates what I want to insist upon again and again, that bacteria are rendered harmless and, indeed, lose their vitality unless they have the proper media or foods to subsist upon. In the case of acid-producing bacteria, these are chiefly starchy and saccharine foods. The putrefactive process in meat is not usually accompanied by the production of an acid. If you will select carefully a particle of starchy food which has remained attached for a few hours to the surface of a tooth while the mouth was at rest, you will, in the majority of cases, be able to detect an acid reaction, although the saliva may be distinctly alkaline.

Take, again, two specimens of saliva,—one clear as water with a nearly neutral reaction, the other thick, slimy, and stringy with a higher specific gravity,—and sterilize both specimens. This must be done with patience and care, for the ptyalin will change if the temperature gets above 63° or 64° C.; but, after a few failures, it can be done. Now, into both tubes, previously sterilized, introduce bacteria of the same kind and as nearly as possible the same quantity, although the latter precaution is a matter of small moment. At the end of twenty-four hours the bacteria in the tube containing the thick, ropy saliva will have multiplied many thousand times more rapidly than the bacteria in the tube containing the clear, watery secretion. This will make clear to you that the character of the secretions of the mouth play an important part in the growth of bacteria, and your clinical observations will bear out the deduction made from laboratory experiments.

If you will carefully note a hundred cases, you will find, I think, as I have, that this thick, ropy saliva is so frequently associated with rapidly progressing caries as to make it at least a fair inference that it plays an important part in its production. Indeed, by putting your finger on a patient's gum and feeling this slimy, mucous-laden saliva you would probably be willing to hazard a

guess that caries was active in that mouth, even if your eyes were blindfolded.

I value clinical observation more highly even than laboratory investigation, and am somewhat suspicious of a scientific theory that does not appeal to the common sense of the practitioner. It is a pity, therefore, that more perfect records of their daily observations are not kept by dentists generally. It would be valuable to know how nearly these laboratory tests of saliva conform to the experience of the practitioner. It would also be interesting to find out whether this thick, ropy saliva was secreted in that form or whether it was brought from the glands as a clear, watery fluid and became thick and viscid by taking up the products of catarrhal or other inflammations. It would be a valuable addition to our knowledge to know whether it is due to bacteria which produce a gelatinous or glue-like substance which, becoming mixed with saliva, may account for the ropiness thereof. There are bacteria found in the mouth that if cultivated in bouillon will render it thick and ropy. I have not found that these are the forms which produce lactic acid, though they may have a bearing on caries in another way. So far, my experiments have not been accurate enough to establish the cause of this viscosity of saliva, owing largely to the difficulty of getting the saliva pure from the sublingual and submaxillary glands. It is, of course, easy to procure it from the parotid gland, and I have found marked differences in the consistence of the saliva from parotid glands of different individuals; but there seem to be only slight differences in its value as a culture-medium for bacteria. If it can be shown that this condition has its origin in the glands themselves, it points to constitutional treatment. If it can be shown that catarrhal or other inflammations affect it, we have indicated another line of treatment; but if the ropiness and viscosity of the saliva is brought about by gelatin-producing bacteria, we must look in another direction for our remedy.

Some time ago a well-known writer advanced the theory of gelatinous plaques to explain some apparent incongruities in the existing theory of caries. Professor Black, you will remember, had made a most remarkable series of experiments, analyzing thousands of teeth, testing their specific gravity and crushing strength, and with infinite pains and labor had demonstrated to his satisfaction that caries was dependent upon environment alone, and that the structural differences in teeth would in nowise explain the phenomena of susceptibility and immunity. This not only corroborated Miller's theory, but went far and away beyond it, and was accepted by scientists with but few exceptions. The obstinate twelfth jurymen, however, in the form of the practicing dentist, continued to shake his head in doubt. It was difficult for him to give up all clinical observations, even in the face of such convincing laboratory experimentation; and he holds to the belief to-day which he cherished before this work was given to the world, that, from some cause or other, we know not what, some teeth are more resistant to caries than others. You can explain over and over again that there is no difference in the structure of the teeth, but he

will stick to his opinion that, in spite of environment, some teeth do resist decay better than others. I can recall no instance of a difference between clinical observation and scientific theory in which the theorist was not obliged to give way before the obstinate common sense of the practitioner, and so I fancy it will be in this case. I think, however, that in the controversy which arose after Dr. Black had published this remarkable piece of scientific work, grave injustice was done him by superficial readers. Dr. Black did demonstrate that the slight differences in the proportion of the lime-salts in the teeth had no bearing on the rapidity with which they yielded to caries. He did not deny that some teeth were harder than others to the cutting instruments, nor do I think that he denied that some teeth, from some inherent cause, not brought out in the investigation, were more resistant to carious action than others. In a later publication, which I quote from, he makes the following statement: "With our present knowledge, it may be stated that the susceptibility to caries of the teeth is influenced by heredity, by the age of the person, and by fluctuations of bodily conditions."

Accepting Dr. Miller's theory and indorsing Professor Black's conclusions, Dr. Williams suggests the influence of gelatin plaques as explaining some of the phenomena of decay which were not quite clear. It would seem, if I understand Dr. Williams's theory, that acid-producing bacteria attach themselves to the teeth, and before proceeding to the attack they cover themselves with a transparent gelatinous coating which protects them from tooth-brush or other enemies, and, securely ensconced behind this armor-plate of gelatin, they produce lactic acid, which comes in direct contact with the tooth, and cannot be reached and washed away by the saliva. Thus is begun the first stage in the carious process. I know that it can be demonstrated when the teeth are apparently clean that there is sometimes a transparent coating which adheres to them. This can be scraped off and stained and examined by the microscope, and cultures can be made from it. In every instance, a variety of bacteria will be found, and in no case will it be demonstrated that acid-producers are predominant. Miller long ago stated that dental caries began with the enamel cuticle, and spoke of it as forming a matrix for innumerable bacteria. Whether this enamel cuticle is identical with the gelatin plaque of Dr. Williams I am unable to determine, but bear in mind that this transparent film is in no way to be confused with what we know as sordes, nor is it the white deposit so often seen on badly-cared-for teeth. It is invisible to ordinary observation, but remains after the teeth have been subjected to the ordinary brushing, and can be scraped off with proper instruments and examined microscopically. Dr. Black gives to these transparent films what I should consider almost undue importance when he says, "Observations already made render it certain that caries of the teeth has its beginning when the conditions of the oral cavity are such that the micro-organisms causing caries form gelatinous plaques by which they are glued to the surfaces of the teeth. This process seems necessary to the first starting of the process of decay."

Miller, however, speaking a year later, says, "Williams, Black, and others incline to the view that this film is necessary to the origin of caries, a point on which I am not quite convinced, as my observations would lead me to think that wherever food finds permanent lodging-place between the teeth to undergo acid fermentation, there decalcification is bound to take place in course of time, whether there be a film present or not."

My own experiments lead me to indorse Miller's views, while it must be acknowledged that these so-called plaques throw light on innumerable instances of decay that cannot be explained in any other way. Just how these gelatin films are formed is still, to my mind, a matter of doubt. With the exception of the *Staphylococcus pyogenes aureus*, acid-producing bacteria do not, as a rule, form this gelatinous substance, and in the case of the *Staphylococcus aureus*, the chromogenic action which gives to deposits of this organism a yellow color removes this one from the catalogue of possible formers of transparent films. When acid-producing bacteria are cultivated in gelatin and blood-serum, and, possessing the liquefying power, break down the culture-media into a gummy, gelatinous mass, this result is not to be confused with a gelatin-producing action of bacteria, since it is the result of the change which takes place in the culture-medium itself. The gelatin-producing action in a liquid medium of certain forms of bacteria is what I refer to, and this action is far more common with these forms which are not acid-producers. It might be deduced from this that certain bacteria, unable to attack the teeth themselves, perform the friendly office of furnishing a protecting envelope to the acid-producers while the latter perform their nefarious work of destroying the teeth. Such a theory rather stretches the imagination, but perhaps the strain is not greater than in picturing the acid-producers as furnishing their own protecting coat. There is, however, a practical point on which we can all agree, and that is that gelatinous plaques are usually found in the mouths containing the thick, viscid saliva of which I have already spoken, and it will probably be found that that which produces this ropiness in saliva produces also the transparent films that play so important a part in the destruction of the teeth.

To sum up, we have found that saccharine and starchy foods, if left in the mouth, encourage caries by furnishing the material for acid fermentation. Deprived of this food supply, bacteria become inert and die out; supplied with it, they multiply enormously and induce active fermentation.

We have found that the saliva of some mouths is better fitted for the growth of bacteria than the saliva from other individuals. Just what the difference is has not been determined, but the fact can be established beyond peradventure. We have found that in certain mouths gelatinous films or plaques are formed on the teeth, and are resistant to mouth-washes and ordinary brushing. We have found that these plaques correspond in many instances to the beginnings of the carious process. We believe that the existence of gelatin plaques is coincident with a thick, viscid saliva so frequently found in those mouths in which caries is proceeding rapidly,

and that the removal or prevention of such plaques will retard and prevent a portion, at least, of the destructive process.

Moreover, it can be established that some teeth are more resistant to carious action than others. That this is true of caries produced artificially in the laboratory no one who has experimented largely can deny, and it seems to be borne out by the clinical observation of our most careful observers that living teeth also differ in susceptibility and immunity. It is true, also, that in the laboratory, as in the mouth, caries can be produced more rapidly by mixed cultures of bacteria than by pure cultures of any acid-producing form. It has not been determined, however, what combinations favor the development of caries, nor has it been shown what forms, if any, act to render other forms inert. Time will not permit us to consider other causes which have a marked bearing upon the destructive process in teeth. Loss of function by reason of our civilized methods of preparing foods, irregularities which facilitate the lodgment of food particles and bacteria, diseases of the stomach and throat, climatic conditions which induce catarrhal inflammations, mouth-breathing, malnutrition, heredity, temperament, intense mental activity, and other reflex actions,—these and many more I must postpone the consideration of for another paper.

The few remaining minutes I must devote to suggestions for overcoming the evil as we have found it to exist. Several plans have been suggested by different writers. A plan that has excited the greatest interest and been most widely ridiculed is the one suggested by Dr. Hart, of California. Applications are made to the teeth every few months for the purpose of sterilizing them and rendering them resistant to the action of bacteria. The plan has many objectionable features, but any suggestion honestly made with the object of preventing caries is entitled to respect.

Another plan has been suggested by Dr. D. D. Smith, of Philadelphia. Dr. Smith's plan is simplicity itself, and consists in thoroughly polishing the teeth every two weeks with an orange-wood stick and pumice. Dr. Smith certainly has the courage of his convictions, since he is willing to enter into an agreement to do all dental operations necessary for a fixed sum per year, provided that the patients will faithfully follow his plan and come regularly for his appointments. In this latter provision lies the most important factor in prophylaxis. Our present plan of conducting a dental practice will be faulty and unscientific just as long as we look upon a defective tooth not as a diseased organ, but as a piece of furniture needing repair. No matter how skillfully and conscientiously we perform dental operations, we cannot prevent disease by that means. The utmost that we can do is to repair damage and make necessary reparation, and the very facility with which lost teeth can be restored has unconsciously led us to belittle the value of the normal, healthy organ. To illustrate my meaning better, suppose that crowns, bridges, plates, and artificial substitutes had never been discovered. Suppose that in the case of every child that ever came to you for treatment you had to face the proposition of preserving every natural tooth in its entirety, or seeing the ultimate and

irretrievable loss of all masticating power, together with the hideous deformities that the loss of teeth brings about. Conceive, if you can, a condition in which the dentist is not only called upon to save every one of the natural teeth, but he is depended upon to do it. Conceive, moreover, if you can, a condition in which the patient is not only willing to subject himself to the dentist's will and faithfully carry out all his directions, but he actually insists that the dentist shall take all responsibility and pledges himself to follow such treatment as the dentist dictates. Suppose, again, that the loss of a tooth, instead of being looked upon as an easy solution of a difficulty, should be looked upon as a disgrace. Suppose the dentist in whose practice such losses were repeated should be branded as incompetent and unfit to practice his profession. What would you do? Why, you would save those natural teeth. It would not be necessary to talk to you about prophylaxis; you would almost by intuition find means to prevent this destruction, and your patients would help you. As it is now, they know that the loss of a tooth is not irreparable, and while they would refute with indignation the implication that they were willing to have an artificial substitute for their own teeth, yet they are taking chances every day that they would never dare take if they felt that no artificial substitute could be made.

The suggestion that I would make now is that a reform be instituted in the practice of each one of us. That we reorganize our practice so that we can prevent more and substitute less as time goes on. In order to do this, we must start with the highest conception of the importance of our work, and erect for our aspirations only the highest standards. We must clothe our profession in the royal purple and respect it. It is worthy of all worship. We must believe in our ability to reduce carious action to a minimum, and we must inspire our patients with the same belief. We must show them that it pays better to prevent trouble than it does to repair damage. This can be accomplished in due course of time by serious and helpful talks during appointments. That hour should be made use of to show how care and timely interference might have prevented just such an operation as the one you are performing. It should be used to warn the parent in regard to the child. It should be used to awaken a respect for and confidence in our profession that will go far toward bringing about a perfect understanding between the public and the profession. There are few people who are too superficial to make an impression upon if you believe in yourself and respect your work.

Let us now imagine the case of one of your patients who has been undergoing the usual spring siege. Having put every tooth in as perfect order as may be, and having thoroughly cleansed the teeth, we will assume that the last appointment has been reached. You have made use of your odd moments in previous appointments to do good missionary work, and you have succeeded in redeeming this human mind from error, and have awakened an interest in the salvation of his teeth. You will decide then when it will be necessary to see him again, and, instead of telling him to come next

autumn or next winter, with the likelihood of his making his appearance six months or a year after the time suggested, you will jot down his name in your appointment book and tell him that you will send for him as the time approaches when you think it necessary to examine his teeth again. You will probably fall into the error of putting the date too far ahead for fear of imposing upon him. Don't be afraid. A patient will be so delighted to find that only a polishing and an examination are necessary that the bill will be paid with promptness and gratitude. Your method will be vindicated, and the patient's confidence will be increased. If you ask me just how frequently it is necessary to see patients, I can only answer that the frequency must vary with the necessity of each case, and this your judgment must decide. I begin with children as early as I can get them. As soon as I detect the slightest cavity, I infer that there are agents at work to cause others, and, having filled the initial cavity, I begin with a most thorough polishing of every tooth with the orange stick and pumice. You cannot be too thorough. I prefer not to use the engine for this purpose, and especially when handling children. It is my practice, then, to have the child brought back for another polishing and examination in two weeks. If every tooth is clean and free from caries, I may put off the next visit for three weeks, and again polish with pumice. And so on, lengthening the interval between visits if the teeth remain in perfect condition, and shortening the time if caries be discovered. The polishing with pumice removes the gelatinous plaques from the teeth as nothing else will do. It frees the teeth from food particles not ordinarily reached by the brush and silk; it removes bacteria, and, by stimulating the activity of the blood-supply in the pulp, probably improves the texture of the tooth and increases its resisting power. Moreover, by this method you are able to detect each carious process at its earliest inception, and can take the child through life without a serious or painful operation. At the same time that these frequent visits of the patient to the dentist are robbing dentistry of its terrors, they are stimulating the patient to a higher standard of care, and teaching him to respect the teeth with which the Almighty endowed him.

With this suggestion I must close: your own judgment will indicate how to deal with older people. It will teach you how to gain the co-operation of your patients and the mothers of the children, and if you keep the standard high it will not be long before you will see the results in the gratitude of your patients and in your own satisfaction.

In another paper it is my purpose to continue this subject of prophylaxis and take up the question of improving the mouth secretions, the restoration of functional activity to the teeth, and other considerations which bear upon the question of the prevention of caries. Suffice it now to say that every plan for improvement must have its basis in high ideals, and its practical fruition must greatly depend upon the avidity with which we seize the opportunities which present themselves. I quote as a fitting suggestion in this connection some lines by the late John J. Ingalls on "Opportunity".

"Master of human destinies am I;
 Fame, love, and fortune on my footsteps wait.
 Cities and fields I walk; I penetrate
 Deserts and seas remote, and passing by
 Hovel and mart and palace, soon or late
 I knock, unbidden, once on every gate.
 If sleeping, wake; if feasting, rise before
 I turn away! It is the hour of fate,
 And they who follow me reach every state
 Mortals desire, and conquer every foe
 Save death; but those who doubt or hesitate,
 Condemned to failure, penury, and woe,
 Seek me in vain, and uselessly implore;
 I answer not, and I return no more."

CORRESPONDENCE.

THE COMING FEBRUARY MEETING OF THE SOUTHERN BRANCH, NATIONAL DENTAL ASSOCIATION.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—At the last meeting of the Southern Branch of the National Dental Association, held in July, 1901, at Nashville, Tenn., it was considered advisable to appoint the time of the next meeting on some date in February, as in the case of the former meetings at St. Augustine in 1899 and at New Orleans in 1900. In doing this it was feared by some that the association might be crippled in regard to the reception of new members, as members can only be received as delegates from regularly organized state and local societies, and there will be no meetings in the Southern States between now and the time of the Atlanta meeting in February from which delegates might be sent. However, if the presidents and secretaries of the state societies will take a little interest in the matter, the obstacles can largely be overcome.

All the delegates elected at the last meetings of the state societies who did not present their credentials at Nashville will still be entitled to present them at Atlanta, February 18 next, and get full benefit thereof, as the year for which these credentials were issued will not have expired at that time. The holders of these certificates may not be aware of the fact that they are entitled to this benefit, and should therefore be at once notified by the proper officers of their associations.

The attention of all the state and local societies holding regular meetings before February is respectfully called to the matter of electing delegates for the next meeting of the Southern Branch. Each society is entitled to *one* delegate for every *six* of its regular membership.

The officers and members of the Southern Branch sincerely hope that all to whom this communication is addressed will keep the matter in mind, and thus assist in making the Atlanta meeting the most successful yet held.

Very sincerely,

H. HERBERT JOHNSON, D.D.S.,

President S. B. N. D. A.

PROCEEDINGS OF SOCIETIES.

THIRD INTERNATIONAL DENTAL CONGRESS, PARIS.

(Continued from page 1022.)

SIXTH DAY—TUESDAY, AUGUST 14, 1900—*Continued.*

GENERAL ASSEMBLY—CLOSING SESSION.

THE meeting was called to order by President Godon at 2.40 P.M. Dr. Michaels presented the regrets of Dr. Lecaudey, who, owing to illness, was unable to be present.

Dr. SAUVEZ, the secretary-general, read his report, in which he said that one hundred and two papers had been read and discussed in the different sections, and that eighty-one *confrères* had given practical demonstrations in the two schools. He thanked the members of the different committees for the assistance they had rendered to the organizers of the Congress. This report was unanimously approved.

Dr. VIAU, the treasurer, then read his report. He said that the number of members was 1126. This report was also unanimously approved.

THE PRESIDENT, in the name of the Congress, thanked the secretary-general and the treasurer for the amount of work they had accomplished.

Dr. MARTINIER then read the report of the Committee on Requests and Resolutions. Dr. Martinier explained under what conditions the committee had been organized. He emphasized the international character of the forty-two requests that the committee had accepted, and stated that a certain number of resolutions were not taken into consideration because they had interest for the dentists of France only. The resolutions had been divided into three groups,—the scientific, the technical, and the professional and social groups.

Dr. Martinier then reviewed the different resolutions, of which only twenty-two were recommended to the Congress for their adoption.

THE PRESIDENT. Dr. Martinier has enumerated the different resolutions that have been examined by the committee. The conclusions that the committee presents to you in the form of resolutions are the result of the examination of the different requests. The twenty-two resolutions which appear in this morning's bulletin are the conclusions that the committee has reached. We will take these resolutions one by one, and submit them for your approval.

Dr. POINSOT. It seems to me that a very important resolution has been prepared; it is the one concerning the examination of dental students. These examinations take place at the end of the twelfth inscription (third year). At this time the student has to review his studies, and to prepare his practical examinations. This means considerable work. A resolution has been prepared providing that the students shall pass yearly examinations.

The PRESIDENT. The resolution to which Dr. Poinsoot refers is wholly of national character. Dr. Martinier told us in his report that all the resolutions must be of the international order. I do not know whether it is possible to modify the resolution so that it may assume an international character. When we reach the discussion of educational problems, I may ask that this resolution be referred to the International Committee of Education that we shall appoint at this session; this committee will see whether the character of the resolution can be thus changed.

RESOLUTIONS.

Resolution No. 1:

"1. That as soon as possible a uniform method of culture for the study of micro-organisms shall be established."

Dr. CHOQUET. I want to explain the importance of this resolution. It is of great importance for those who make a specialty of bacteriology and are acquainted with the cooking manipulations which are carried on in laboratories; they also know the different results which are obtained according to the nature of the culture-media. In order to obtain good results from bacteriological work, it is indispensable that not only in France, but in foreign countries, the work shall be performed on the same basis. Bacteriology is being studied extensively in France, England, Germany, America, and other countries, but everywhere we see that the work is carried on differently. In various bacteriological laboratories the bouillon is prepared in different ways. For instance, in Germany it is made from an emulsion of Liebig's extract; in France from an emulsion of meat cut into pieces of different sizes, which are macerated in warm or cold water. The results obtained from growths in these bouillons must be different.

The resolution that I propose is not a new one. It was presented for the first time in France in 1898 by M. Grensberg, one of the professors of the École Dentaire. Two months afterward the American bacteriologists prepared a report calling for the establishment of a universal method of culture. In an international dental congress like ours we must treat the question thoroughly; it is absolutely necessary that this matter shall be decided upon, and that an international committee shall be appointed to see that all bacteriologists work on the same basis.

Allow me in this connection to make a comparison. Let us suppose, for instance, that Mr. X discovers a microbe. He publishes his communication, and continues his work. He receives a letter from a *confrère* stating that the microbe that he has discovered presents itself in the form of a bacillus. He then sends him cultures of his micro-organism. This *confrère*, who has a different method, starts the culture of the micro-organism, and, instead of finding the bacillary he finds the coccus form. In such a case he will either write to tell him that he has made a mistake, or else he will not answer at all, thinking that the author was not honest in his assertions.

I believe that an unchangeable rule should be established, in order

to obtain the unification of the methods of culture, so that in the future all may work on an equal basis.

The PRESIDENT. The committee is so thoroughly convinced of the utility of this resolution that it has adopted it, and asks you to confirm its decision.

Adopted.

Resolution No. 2:

"That the manufacturers shall follow the suggestions of dental societies with regard to the color of rubber, the natural form of the teeth, the composition of alloys, and the manufacture of other products."

Adopted.

Resolution No. 3:

"Substitution of the words 'cohesive gold' for 'adhesive gold.'"

Adopted.

Resolution No. 4:

"That the dental diploma shall not be delivered before the age of twenty-one."

The PRESIDENT said that this was a necessary measure for the welfare of the profession.

Dr. POINSOT pointed out the inconveniences that might result therefrom.

Dr. SAUVEZ asked for the substitution of the words "license to practice" instead of "dental diploma."

The modified resolution was adopted.

The PRESIDENT said that Dr. Dowsley, of Boston, had formulated a demand for the unification of diplomas in all countries.

Dr. STÉVENIN. Before speaking of the unification of diplomas, we should speak of the unification of the teaching methods.

The PRESIDENT. In such a case the request could be referred to the Committee on Education, so as not to take a hasty decision. This resolution was only presented yesterday or this morning.

Referred to the Committee on Education.

Resolution No. 5:

"That the best way to abolish charlatanism consists in the education of the public by the popularization of dentistry and dental hygiene through societies, papers, and schools."

Dr. DOWSLEY demanded that energetic measures be taken in order to secure a favorable result.

The PRESIDENT answered that because of the indifference shown by the governments, the best way is to educate the public.

Adopted.

Resolution No. 6:

"That professional honor shall be assured by a written engagement to be given by those entering schools or professional societies to practice in an honorable manner; that is, not to advertise or to commit any act against professional dignity."

Dr. SIFFRE said that he believed that such an engagement would

be of no value, as the students would not be of age at the time of making the pledge.

Dr. PONT held that, as a moral engagement, it would be better to have the student sign the engagement at the time of leaving the school.

The PRESIDENT said that such a promise might have a good influence upon professional conduct.

Adopted.

Resolution No. 7:

"That the preliminary education possessed by the dental student before entering the schools should include: A literary education, comprising the knowledge of two languages, a scientific education, and manual training."

Adopted.

The PRESIDENT then submitted to the Congress a resolution formulated by Dr. Queudot, as follows:

"That the medical branches shall be taught by the schools of medicine before entrance into the dental schools."

The PRESIDENT. Reference has been made to Dr. Gires' report. I said that I had laid upon the Congress desk the letter of Dr. Kirk, dean of the Dental Department of the University of Pennsylvania. I thought that it was not necessary to read it, but as a discussion on this question has arisen, I beg the secretary-general to read it; it will give you the opinion of Dr. Kirk on primary education.

The following is the letter to which Dr. Godon referred:

My dear Doctor,—It is with much pleasure that I answer your request for my personal views on the subject of the general character of the preliminary education which would be to my mind the best adapted to prepare a student for undertaking the professional studies leading to a dental diploma.

I have for several years made a serious study of this very important question, and have observed with great interest the effect which preliminary education has had upon students who had been instructed under different conditions before undertaking their professional studies. My attention has been especially concentrated on this question for the last three years because of a rule of the faculty of the Dental Department of the University of Pennsylvania which progressively increases the entrance requirements. I have thus been in a position to observe the result of our system of preliminary education in relation to the increase in the required preliminary education for matriculation in dental schools.

To my great surprise, I have observed that the number of those who fail in their yearly examinations has increased in proportion to the increase in the entrance requirements. I was far from expecting such a result; naturally I had thought that a more advanced preliminary education would better prepare a student for the undertaking of professional studies. I therefore applied myself to make a thorough examination of this question so as to find the cause of this paradoxical situation. I then discovered the very interesting point in this problem,—viz, that the students who had received their preliminary education in the manual training schools were in every respect better prepared to comprehend and assimilate the teachings given in the professional lectures, while those students whose preliminary education had been of a purely literary nature were those whose results were the least satisfactory. I then examined the nature and extent of the teachings in our manual training schools, as this preparatory education seemed to be the best that could be given to a student in order to enable him to pursue his professional studies.

Our manual training schools in the United States—especially in Philadelphia, where the system is perhaps best developed—are based on the theory that the intelligence of the student must be trained not only through the ear and the eye, but also through the sense of touch. In consequence the student devotes a portion of his time to manual exercises—exercises of mechanical technique—which are carefully selected from the point of view of their power to instruct the mind through the hands.

In our manual training schools the fact is never lost sight of, that the object of this education is to give to the student not the ability to manufacture things, but to give him through the making of material things the habit of minute observation, of logical reasoning, and of precision. The introduction in the preparatory education of a certain amount of manual training exercises produces a remarkable effect upon the student's mind which manifests itself in the great facility with which he assimilates the purely cultural studies of science and literature. Expert professors in this department have assured me that in the schools where the manual training system has been adopted the students will accomplish in two hours in the cultural classes (science and literature) work which would ordinarily require three hours where manual work formed no part of the training.

I will also remark that in our manual training schools a very careful allotment of time has been made to the three important divisions of the work,—viz, literature (history, languages, etc.), science, and manual work. My own experience and the study that I have made of this subject have made me believe that the best preparation for the study of dentistry is the one that is based on an harmonious division of these three parts of education. Naturally, I do not want to affirm that the instruction which is given in the best of our manual training schools is the ideal preparation for the study of dentistry, but I say that my observations show me that the system of preliminary education based upon the general model of the manual training schools is the best adapted for our needs.

Please accept the expression of my most sincere regards.

Dr. GODON then said that although the letter had no direct bearing upon the discussion, he nevertheless had referred to it, it being his desire that it be published in the Transactions because of the authority of Dr. Kirk, the dean of the Department of Dentistry of the University of Pennsylvania.

Dr. ROY. I must say that I am opposed to that resolution, for the reasons indicated in my paper on dental education. I consider that the way in which the lectures are arranged is defective, and not sufficient for the needs of dental students, who have either to devote too much time to the medical studies at the expense of the dental studies, or else to devote an insufficient time, which results in the making of incomplete studies. For my part, I believe that the essential teaching should be given in the dental schools, because only there can the scientific and medical lectures be developed in a way appropriate to the needs of dental students.

Dr. SIFFRE. I request the floor in order to support the amendment of Dr. Queudot, the director of the École Odontotechnique. It should not be presented in the form of an amendment, but in that of a resolution; but the committee has decided to present it in that form. As I agree with Dr. Queudot, I support his amendment, and I will give you the reasons why I do so.

You will have to decide the following question: Has the dentist at the present time tendencies toward medical science, or, on the contrary, toward the special technique of operative dentistry and of prosthesis? I believe, considering the actual state of professional education, that the student should first make all the necessary

studies which he will later apply to the study of his particular profession. At the present time has to be considered in what direction dentistry should go. I think that if you do not approve the idea of Dr. Queudot, you will commit a blunder and present an anachronism.

After examining the nature of the papers brought before the Congress, and after quoting from Dr. Gires' report on American dental education, Dr. Siffre said that very little importance had been given to prosthesis. In an international congress such as this the evolution of dentistry must be recorded. We should follow the progress of our times, and it is absurd to go back to former times,—that is, to graduate students now whose knowledge is less than that of the students of the past. If the Congress is logical and consistent with itself, our efforts should be directed toward scientific studies, which will make good students, capable of comprehending what is explained to them. The medical education should not be given to the students at the expense of the special instruction, and if you consider that three years are not sufficient, increase it to four; in this way we shall have dentists who will honor our profession.

Dr. POINSOT. Considering the actual state of the educational question and the laws that govern us, two points come up for consideration. One is a fact and the other a desire. Dr. Queudot thinks that it would be a good thing if the medical education was not given in the dental schools. It is a good thing, but one which does not seem to be appropriate just now. Considering the condition that we have, and for as long as they may last, we should organize ourselves with the means at our disposal; and we must be in favor of dental teaching. Dental education is arranged in such a way as to make good dentists having the necessary medical knowledge. The conditions demanded by Dr. Queudot are new things that do not exist, and that could only exist through the introduction of radical changes; and I question if the new arrangements would be of any advantage. We are in doubt as to what could be expected of your resolution and of the reform that you would like to introduce into the already existing conditions. Anyhow, a complete transformation of things would be necessary in order to act differently to what we are doing now.

Dr. ROY. I have been very glad to hear Dr. Kirk's opinion. I think that we Frenchmen look upon this question from a national standpoint. Now, in a congress like this it is not only dental education in France that we should discuss, as certain speakers do, but we should look at the question from an international point of view. We should study and pass resolutions concerning an ideal dental education. These teachings cannot be applied in the same way in every country. We should prepare an absolutely ideal dental program, and then every country should adapt it in the best possible way to its particular laws and rules. But we should not deal with laws that do not concern us. Professional men such as we are should work only for the production of ideal dentists.

As Dr. Siffre has mentioned the report prepared by Dr. Gires, I will ask him to read that page where Dr. Gires says of another American dental school, that, while the medical education is given

in the school, it is carried on upon good lines, and that the students possess sufficient culture. This part alone of Dr. Gires' report is enough to destroy the arguments put forth by Dr. Siffre.

Dr. CHAUVIN. I did not intend to take part in this discussion, but I think that a very important point has been forgotten. It is undeniable that we should treat this question from an international point of view, and I believe that in the discussion brought about by Dr. Queudot the attitude has been of international character. In the majority of states the medical education of the dentist is not complete, and the medical degree is not required in order to practice dentistry. In consequence, Dr. Queudot's proposition affects the international interests. But, nevertheless, I must say that I do not agree with him, or with Dr. Siffre. He does not take into consideration that the training of the dentist demands considerable time, and that the time now devoted to it is insufficient. You see that to-day two years of dental studies are required from the doctors of medicine that direct their attention to dentistry, because those who know the organization of the dental schools and the teaching given therein understand that one year would be insufficient. What is the nature of the services that the dentist renders in his office? I do not deny the utility of theoretical studies; I do not deny the necessity of having some knowledge of histology, pathology, and the medical sciences, but I have always maintained that medical sciences should be applied to dentistry in the way that is best adapted; that is, that they should not be applied in an absolute manner, but under conditions especially appropriate for their application.

Gentlemen, although the discussion is of an international nature, I am obliged to follow Dr. Queudot in his arguments on the national side of the question. If medical education is to be taught to-day in the medical schools, a question comes up for immediate consideration: Are these schools in a position to teach the medical sciences according to the needs of the dentist? I do not believe they are, and I have the proof of it in what I have heard medical students say with regard to medical examinations for dental students. They said that dental students were asked questions of a purely medical nature, and that many medical students would have had difficulty in answering them. Do not believe, gentlemen, that I want to restrain the dental students from acquiring a medical education. I am of the opinion that the program should be as extended as required; but to say that it cannot be given in the dental schools is an affirmation which seems to me to be a mistaken one. I consider that this teaching could be better given by the dental than by the medical schools. Before concluding, I want to say that I agree with what Dr. Roy has said. The same legislation does not exist in every country, hence we should only prepare the dental program, stating the amount of medical and technical training to be required from the dental student. After preparing this program, and after establishing it in the different countries, it would not make any difference if the schools were connected with the state or not, if they conducted the examinations so as to be sanctioned by the state, or

if the examinations were to be passed directly before a school of medicine. Only when that time arrives shall we be able to organize dental education in France in such a way that it shall be uniform from an international standpoint.

Dr. GIRES. Dr. Kirk's letter has been brought up, but it is not applicable from the point of view of Dr. Queudot's resolution. Dr. Kirk says in his letter that he has noticed that among the students of the institution with which he is connected, those who have a literary and theoretical education do not become as good dentists as those that have attended the manual training schools. This has not a great deal to do with Dr. Queudot's resolution; he only asks that the medical portion of the teaching shall be given in the faculty of medicine. I demand that we vote on the question.

Dr. SIFFRE. Dr. Queudot did not say that the medical degree should be required. We want the dentist to have a sufficient medical education to be able to practice dentistry in an intelligent manner.

Dr. QUEUDOT. Yes, manual education is indispensable to make a good practitioner; we all agree on that point. Dr. Chauvin, with whom I am on excellent terms, has just said that he does not agree with me. This is very curious, because I agree with him. I want to make good practitioners, just as he wants to do, and when I tell him the way to do it he refuses to listen. To-day the dental student is obliged to pass certain examinations before the faculty of medicine. I propose that these examinations be passed before entering the school, instead of at the time of leaving the school, because I have observed that the students pay a great deal more attention to those theoretical studies than to the true dental subjects, as Dr. Chauvin would desire.

Dr. BROPHY. While I have not been able to understand the discussion in French, I have gathered from those who do understand it that the amendment to the resolution here offered is that medical education be given by the faculties of medicine, and considered as preliminary to admission to dental schools. Mr. President, we have in this Congress gentlemen who have not attended medical schools, and yet most valuable contributions on the subjects of anatomy, physiology, chemistry, materia medica, therapeutics, and all the collateral sciences have been here made by them, and stand to-day as part of the literature of our profession. Some of us from America have had experience in exactly this line of work. In the early history of the institution with which we are connected in Chicago the plan was originally to accept only graduates in medicine, and, after giving them a course of instruction extending over a period of two years in the special lines to qualify them to practice dentistry, we found that such a course of instruction was a failure. It was a failure because, in the first place, we could not get the men in that period of time to acquire that delicate manipulative skill which is so essential to success in the practice of dentistry; besides, they did not comprehend the magnitude of the work before them. We passed through this experience under the most favorable possible circumstances and conditions, but we finally were obliged to

abandon the plan and substitute the course of instruction that is now pursued. Why should we, of this great profession, including as it does in this great Congress nearly twelve hundred representatives from all parts of the world, ask others who have no knowledge of the essentials of dental practice to do something to prepare us to enter upon a course of instruction of three or four years, as the resolution states? (Applause.) It seems to me that with equal propriety the gentleman might insist that we should take up a course of technology,—broad technology. And, again, I think my friend who offered the amendment to this resolution forgets that chemistry is not medicine, anatomy is not medicine, physiology is not medicine, but they are all utilized and made component parts of the great science which is concerned in the treatment of the ills of mankind. And is there any body of men, or are there any people in this world who have more to do with the alleviation of human suffering, upon scientific principles, than those gathered here to-day?

And have we not, in our great institutions of learning, evolved by fifty years of experience in teaching, by such men in my country as Taft and Truman, in France our distinguished president, Godon, and his colleagues, in Germany Miller, in England Mummery, and others of their character, a course to be pursued that will be satisfactory and sufficient to train our students in the lines that they are expected to follow? I might state that a no less distinguished teacher than Jonathan Taft made the statement to me only a few years ago that a greater success would be attained in the teaching of the dental students in the University of Michigan if all those branches—anatomy, physiology, chemistry, materia medica, bacteriology, therapeutics, and morbid anatomy—were taken absolutely out of the school of medicine and taught only in the dental school for the dental students.

Mr. President, I have already taken too much time, but I trust that this amendment to the resolution before us will be voted down, and that we shall not be an appendix to anything, but an independent body and a profession to ourselves. (Cheers.)

The PRESIDENT. I ask you, gentlemen, to allow me the floor for a few moments. During that time I will beg Dr. Hesse to occupy the chair.

It has been suggested that the question be voted upon. This will be done. This is a question of deciding upon what course dentistry should travel, and I will ask you to carefully consider the question before voting upon it. We are in the presence of two courses,—the medical and the special dental.

I have been studying this question of education for twenty years, and I think that I can see through it. Professor Gariel said, "Dentistry is not an art, neither is it a science, but an applied science. We form practitioners of dentistry as the schools of medicine form practitioners of medicine." We agree with this high and philosophical definition of dentistry. In the selection of new paths for our profession we should recognize the opinion of Brophy and of Kirk, dean of the Department of Dentistry of the

University of Pennsylvania; they are experts on educational questions. Now, what should be the preliminary education of the dentist? I said yesterday, when Dr. Kirk's letter was delivered to me, that it was a *pierre de touche* (touchstone). Read it; you will then understand what influence it should exercise on our opinions upon the reforms we wish to bring about in dentistry.

I am not blaming anybody; every one is at liberty to seek the professional development in one way or in another. But we represent an opinion which we defend with all our strength,—hoping to obtain the support of the Congress because the Congress represents the specialization of our profession and its evolution in the most profitable way. Now, what should this preliminary education be? I now come to the proposition of Dr. Queudot, which is the following:

“That the student before entering the dental schools should have a scientific and literary education, and also a medical education. He then would enter the school and would acquire the knowledge of all the sciences required by the dental profession.”

We have been told that medicine, physiology, physics, chemistry, anatomy, and pathology are necessary studies. Will you say that we need the same amount of anatomy, physiology, and pathology as the physicians do? Now, if you adopt Dr. Queudot's proposition, if you want the students to be taught in the medical school, they would learn the same amount of physiology and pathology that the medical students do; this is exactly what we do not want, as we have placed ourselves upon a dental standpoint. I am indicating plainly the amount of medical knowledge that the dentist should have. I think that the dental school is in a better position to indicate the necessary studies for dental students than anybody else. Dr. Queudot believes, on the contrary, that it would be better if the schools of medicine would teach these branches, as these institutions are better organized for the purpose. We will say again that that path should not be followed, for it would bring about the death of all the dental schools after a while.

The proposition that the discussion be closed was adopted.

Dr. Queudot's resolution was then voted upon, and was almost unanimously rejected.

Resolution No. 8:

“That the course of study in the dental schools should be a four-year one.”

An amendment by Dr. Platschick, in favor of reserving a year for the study of prosthesis, was not considered.

A resolution offered by Dr. Richard-Chauvin, that the course of study should be extended to five years, was not considered.

Resolution No. 8 was adopted.

Resolution No. 9:

“That the duration of the studies in the dental schools should be of at least two years for doctors of medicine.”

Dr. BONNARD insisted upon the necessity of this measure.

Dr. THOMARNISON asked that three years of study should be the period required.

Dr. ROSENTHAL observed that the physician can treat without any special preparation cases belonging to the province of ophthalmology or laryngology. It seems, then, reasonable that he should be able to practice dentistry.

Dr. SAUVEZ answered by reading a decision of the Assistance Publique requiring doctors of medicine to obtain a dental diploma before they can hold an official position or take charge of a dental service.

Dr. BONNARD's resolution was finally modified to read as follows: "That the graduates in medicine intending to practice dentistry shall be compelled to pursue for at least two years the practical courses of a dental school."

Adopted.

Resolution No. 10, concerning the formation of an International Federation of Dental Schools, was referred to the International Committee on Education.

Resolution No. 11:

"That an International Dental Federation shall be created."

Adopted.

Resolution No. 12:

"That the national committees that were organized for the Congress shall continue in office, and shall constitute the International Dental Federation."

Adopted.

Resolution No. 13:

"That at the last session of the Congress a committee of seven or nine members shall be nominated to consider the formation of the International Dental Federation, to propose members thereof for the approval of the national committees, and to prepare the next International Dental Congress."

Dr. STÉVENIN asked that as many members shall be in the committee as there are countries represented.

This resolution was adopted after the president had made a few remarks.

Resolution No. 14:

"The International Dental Federation shall be composed of all the national committees represented by an executive council.

"The first Executive Council, comprising seven or nine members, will be nominated by the members of the Third International Dental Congress in its last general session on Tuesday, August 14th, and its powers will expire at the opening of the Fourth International Dental Congress, of the organization of which it shall have charge. The Executive Council will nominate at its first session the Committee on Dental Education.

"The first session will be held on Wednesday, August 15th, at 9.30 A.M., in the École Dentaire."

Adopted.

Resolution No. 15:

"The Fourth International Dental Congress shall be held (at the latest) in five years, in the country which may seem best to the Executive Council, according to the invitations addressed by the different national committees and after considering the question with them. In any case, the decision should be taken at the latest in 1903."

Adopted.

Resolution No. 16:

"That an International Committee on Education shall be organized. It will be the duty of this committee to prepare the program setting forth the theoretical and practical knowledge that the dentist should possess. This committee to be appointed by the Executive Council."

Dr. ROY asked if the Executive Council would be qualified to make these appointments.

Dr. RICHARD-CHAUVIN asked the same question, and proposed that the national associations of the various countries make the appointments.

The PRESIDENT explained that a meeting of the national associations would consume too much time.

Dr. SAUVEZ then presented the following amendment:

"That the Executive Council, representing the International Dental Federation, shall appoint for the International Committee on Education, as far as possible, members from the national associations regularly organized in every country."

The resolution, thus modified, was adopted.

Resolution No. 17:

"That in every school an inspection of the teeth shall be made at least every six months, and that the treatment of the teeth of poor patients shall be regularly provided for; these services to be in charge of a dentist."

Adopted.

Resolution No. 18:

"That the principal rules of dental hygiene shall be taught by means of appropriate tables and charts."

Adopted.

Resolution No. 19:

"That dental hygiene shall be comprised in the study of general hygiene."

Adopted.

Resolution No. 20:

"That wherever the state assures medical services, it shall also assure dental services in charge of dentists."

Adopted.

Resolution No. 21:

"That public dental services shall only be entrusted to practitioners holding the dental diploma of the state."

Dr. SAUVEZ asked for the addition of the following words:

—"not only for inspection and for extractions, but also for treatments."

The resolution, as amended, was adopted.

(A resolution regarding the reduction of the military service of dentists to one year was not considered, as not being of an international character.)

Resolution No. 22:

"That the medical services of the armies and navies shall comprise dentists, as they do physicians, pharmacists, etc."

Adopted.

The following resolutions were also adopted:

(1) One by M. Marcus: Demanding the immediate application of Resolution No. 22 to the armies leaving for China.

(2) One by Dr. Rosenthal, of Brussels: Asking that the metric system should serve as a basis in all professional works.

The PRESIDENT then reviewed the duties of the Executive Council before proceeding to the election of its members. He then submitted to the Congress, in the name of the Committee on Resolutions, a list composed of the following names: Drs. Hesse, Pichler, Harlan, Geo. Cunningham, Förberg, Aguilar, and Godon.

Dr. CUNNINGHAM, while in favor of a limited list, asked that the names of Dr. Grevers, of Amsterdam, and Dr. Sauvez, secretary-general of the Congress, should be added to the list.

The list, with nine members, was adopted.

On motion of Dr. Aguilar, a vote of thanks was addressed to the organizers of the Congress, and in particular to the president and secretary-general.

Dr. GODON thanked the members of the Congress in the name of the officers of the Congress that were appointed in the first General Assembly.

Professor GARIEL said that he regretted that, on account of lack of time, he had been unable to follow closely the work of the Congress, but that he could see that the results were very satisfactory; also that the organization of the International Dental Federation was a measure worthy of much praise.

The Third International Dental Congress then adjourned.

ABSTRACTS OF PAPERS PRESENTED TO THE THIRD
INTERNATIONAL DENTAL CONGRESS, PARIS,
AND DELAYED IN TRANSMISSION.

TREATMENT OF ABSCESES OF THE ANTRUM OF HIGHMORE.

BY DR. EUGENE POUTRAIN, BRUSSELS, BELGIUM.

OF the many cases that the dental practitioner is called upon to treat, few are more interesting than those involving inflammatory changes of the maxillary sinus. The treatment of these affections requires that the practitioner should have the power of observation and a skillful and judicious hand.

I will divide my subject as follows :

First. Origin and symptoms of the inflammation of the maxillary sinus, known under the name of maxillary sinusitis or abscess of the antrum of Highmore.

Second. Manner of making a diagnosis of the lesion, with a description of the instruments used.

Third. Manner of operating in order to establish a communication between the antrum and the buccal cavity so as to bring about the discharge of morbid matters.

Fourth. Medical treatment to be followed in order to keep up a drainage until the inflammation subsides.

1. *Origin and Symptoms.*—Before discussing the treatment of maxillary sinusitis let us recall the anatomical relations of the antrum with the neighboring regions of the head.

There is no cavity in the human body whose shape varies more in different persons than the antrum. Generally it is smaller in women than in men, but it varies so much in size that it can be said with impunity that two similar antra cannot be found, even in the same person. It is sometimes divided into several compartments by horizontal or vertical partitions; the cavity of the sinus can be compared to a pyramid whose base would be against the lateral walls of the nasal fossæ and whose apex would be in the malar bone. The upper wall of the sinus is formed by the floor of the orbit, the inferior wall by the upper portions of the alveoli; it is not unusual to find that this wall is pierced by the roots of the molar teeth, which then penetrate into the sinus. Hence it will be seen that this cavity is related to the diseases which affect the dental organs. Indeed, in all but the exceptional cases in which abscess of the antrum is due to violent external shocks or to the presence of foreign bodies in the cavity,—such as a bullet, or caustic substances that have entered through the roots of teeth,—it may be said that diseases of the teeth are the cause of disturbances of the antrum.

It very often happens in treating upper molars that in spite of all our efforts the tooth remains sensitive and that the periosteum is always inflamed. Under such circumstances the attention of the dentist should be directed to the nose; he should examine the nasal fossæ and observe the sinus, for very probably the periostitis has extended to the membranous lining of this cavity.

By following an appropriate treatment and with the assistance of nature it frequently happens that the inflammation subsides, the tissues regaining their original normal state; but in obstinate cases, as in caries of the fourth degree, when the tooth is stopped with particles of food or by a filling and the pus tries to find an outlet through the root, the result is that the lining membrane of the sinus becomes inflamed; for, as we have already said, very often the roots penetrate the sinus. As we see, it is easy to understand that alterations of these roots may in time cause an inflammation of the antrum. Gradually the pus will fill up the sinus, and when it reaches the level of the nasal opening it will be forced through this aperture, which acts as a valve.

As this opening is above the floor of the sinus, there will always remain at the bottom of this cavity a varying quantity of pus whose retention will be the cause of trouble. The whole face becomes sensitive, sight is weakened on the affected side, indefinable pains of a burning character are felt on one side of the head at the frontal and temporal regions; sometimes an acute and lancinating pain accompanied by chills is experienced. In spite of these pains the soft parts of the face and mouth remain unaffected. Pus of a very fetid character comes out through the nose, but only the patient perceives this repulsive odor. For this reason a distinction is established between ozena and empyema of the antrum, two affections whose nature is sometimes confused. This suppuration is intermittent and becomes abundant when the patient leans toward the healthy side and slightly forward. It may cease during an entire day, but then the patient suffers more, and the day afterward the pus escapes in greater quantity and the patient feels relieved. This is explained by the obliteration of the nasal orifice caused by the engorgement of the mucous membrane.

During the night and while in a horizontal position the pus goes down through the posterior nares and into the throat; the patient in this way swallows considerable quantities of pus and poisons his system. This results in general indisposition, chills, want of appetite, and a continuous wasting away difficult to arrest.

2. *Diagnosis*.—Before undertaking a surgical operation an examination should be made, by means of electric light, which is an excellent auxiliary for the diagnosis of diseases of bones. This *diaphanoscopic* lighting should be made in a dark room by means of a small incandescent lamp of six or eight volts placed within the mouth. When the mouth is closed and the lamp lighted, four clear regions will be seen, two above and two below. The lower ones, which are very large and luminous, are caused by the cheeks, which, being diaphanic, allow the light to shine through them. The upper ones, not so large and less marked, are found in the neighborhood of the floor of the orbits and correspond to the antra.

If one of these be diseased and filled with pus the region will be opaque and the rays of light will not pass through it. The difference between the appearance of this region and the one in the opposite side is very great unless the other side is also diseased. This luminous sign is called the *sign of Heyring*.

In order to facilitate this electrical examination I have devised two small and simple accessories. One is a mask which can be adapted to the irregularities of the face. When the mask is applied to the face only two clear pink regions corresponding to the sinuses can be seen. On account of the contrast produced and by the use of the mask, our diagnosis becomes easier and more certain.

My other auxiliary appliance is that which I will call a reflector and tongue protector. It consists of a circular plate of German silver, four centimeters in diameter, which will keep the tongue in an immovable position and which will also protect it from the heat

developed by the electric current. I have made this appliance especially to relieve the preoccupied mind of the operator and to protect the patient. I generally use a lamp of eight volts, carrying it to twelve volts by using six elements instead of four. In this way I obtain a very dazzling light, but to the detriment of the lamp, which gets hot and may burn the tongue and the roof of the mouth. These accidents cannot occur if this reflector be used. The concave plate keeps the lamp away from the palate, as it rests upon the teeth and prevents the movements of the tongue. A wise precaution is to line the inside of the plate with gutta-percha or with a plate of ivory, which is a good insulating substance for electricity and heat.

By means of the mask and reflector we can easily and quickly make our diagnosis without any danger to the patient. This reflector also lightens both sinuses at once; the lamps hitherto in use for the purpose of diaphanoscopy light only one sinus at a time.

Another luminous sign is the *sign of Harel*. The lamp and the reflector are placed in the mouth of the patient; if the patient closes his eyes he will perceive a sensation of light of a very peculiar character, but only in the eye on the healthy side; he may even see objects through the lids. If the sinus contain pus it will intercept the passage of luminous rays.

Manner of Operating.—Viewed from the patient's standpoint, the two signs, of Harel and of Heyring, could be called active and passive. When these signs have proved the existence of a sinusitis, what should be our procedure? In the case of an abscess the treatment has always consisted in establishing an opening for the passage of the secretions. Where shall this opening be? We have a natural opening, the one that communicates with the middle meatus of the nose, but its position is not regular and sometimes it is not present. Besides, what prevents us from enlarging it is the fact that it is situated too high above the floor of the antrum and hence pus would always remain in the cavity; it is also very difficult to reach the opening through the nose.

If the cause of the sinusitis be a badly decayed tooth, its extraction and the perforation of the roof of the alveolus should be performed without any delay.

If this cause be destroyed in time, the disease will soon disappear, especially if a leech is applied to the gums at the region of the extracted tooth. Inhalation of the vapor of hot salt solution containing menthol and irrigations of the alveolus with formol in the proportion of one part of formol to one thousand of water should also be practiced. Very often the dentist has endeavored to preserve the tooth in spite of all these pathological phenomena, and what happens still more frequently is that the patient neglects the case, thinking that it will disappear without appropriate treatment. In the meanwhile the suppuration has attacked the sinus and the nose. If the sinusitis is chronic a larger opening should be made.

To open through the canine fossa has been recommended. This method is good, especially if the inflammation is of a chronic nature, as it permits of the free curetting of the cavity, an opera-

tion necessary in severe cases; but the closing of such a large opening is very difficult after a cure is accomplished, and hence recurrence of the disease is quite possible.

This operation belongs to the province of general surgery rather than to that of dentistry. If a very large opening has to be made because of the presence of malignant growths in the sinus, or the presence of cysts or tumors, it is better for the dentist to turn the case over to the general surgeon.

The most practical method in the case of simple abscess of the sinus consists in establishing a large drainage channel through the alveolus. The roof of the alveolus, as a general rule, is very thin, and the opening is made in the lowest point of the cavity at a point where the largest amount of pus accumulates. When the opening has been established, a drainage tube should be placed in the canal in order to prevent the closing of the aperture, but now, although an outlet for matter is necessary, the tube cannot be left open, for the reason that food would penetrate through it into the sinus. This difficulty I have remedied in a manner that I will describe further on.

Whether or not the cause of the disease be a decayed tooth, one tooth at least has to be sacrificed. I extract one tooth and take an impression as for a prosthetic piece. Everything being favorable I would extract the first molar, which has the longest roots and is in a position corresponding to the cavity of the sinus. Once this tooth is extracted I take an impression and make a little plate. I then make a gold tube of four to five centimeters in length and a minimum diameter of three millimeters. As many holes as possible should be made in the walls of this tube. The tube being thus perforated, is in this way better adapted to the functions of a drainage tube.

If a bicuspid be extracted the opening should be made through the alveolus. If a molar be extracted I select the alveolus corresponding to the longest external root, and at the corresponding point in the plate I make a perforation of the diameter of the tube.

Local anesthesia is obtained by means of cocain injection. The plate is put in position and the roof of the alveolus is perforated by directing a trephine through the opening in the plate. I take care to give to the instrument a direction perpendicular to the alveolar border. On putting the plate in position we are sure to obtain a straight canal between the sinus and the buccal cavity, and in this way a perfect drainage is established. I prefer to make the opening at once with a large trephine instead of starting with a small one and increasing it gradually.

After the opening is secured I wash the sinus with sterilized tepid water. After the first washing I inject one hundred cubic centimeters of a mixture of one hundred parts of water and twenty of hydrogen dioxid. Hydrogen dioxid is a valuable medicament whenever the question is one of suppressing pus; its oxygen is liberated in the presence of the organic matter, and causes a considerable effervescence, which cleans the cavity in a few moments.

The effervescent hydrogen dioxid comes back through the nose and mouth carrying with it enormous quantities of pus and mucus. I then let the patient rest for a few minutes.

I adjust the tube to the plate in such a way that it will come very near to the upper wall of the sinus. Before placing the appliance I make one or two injections of carbolic acid solution, and have this treatment repeated by the patient during ten days, increasing daily the proportion of carbolic acid by one per cent. I prescribe that every day four hundred cubic centimeters of the liquid are to be injected, two hundred in the morning and the same in the evening.

A very important thing to be recommended is that too much force be not used in making the injection, for it has happened that the great pressure has pushed the infected matter into the frontal sinus. This gives rise to a new infection, one which is of a more serious character, for this time the meninges may become affected, and the treatment, which is difficult on account of the complications that may occur, is out of the province of our calling.

To prevent reinfections, due often to the entrance of food into the sinus through the artificial opening, I securely close the opening in the tube with iodoform gauze maintained in position by silk ligatures. This gauze is changed every time the appliance has to be removed in order to wash out the sinus. After ten days of the use of carbolic acid solution, I begin a new treatment, to be continued for a period of ten days, with a solution of formol 2:1000 in the morning, and of tepid salt solution in the evening. I then continue with zinc chlorid, using a solution of one centigram in one hundred grams of water for ten days, after which the dose is increased to five centigrams. During this new period the quantity of pus will diminish and the washings with hydrogen dioxid will not produce effervescence. Nevertheless the caustic properties of the zinc chlorid, during the first days of its application, sometimes provoke pains in the frontal and facial regions. It naturally follows that the periods of treatment are increased or decreased according to the degree of acuteness of the disease.

When the zinc chlorid treatment is over and the suppuration ceases, we cauterize the membranous lining of the sinus so as to bring about the process of granulation. For this purpose two or three injections are made of a fifteen per cent. solution of tincture of iodine; after two or three days this is increased to one of twenty-five per cent.

Observation has shown that during the treatment here outlined the disorder gradually disappears, the suppuration diminishes every day and finally ceases, the appetite returns, and the patient feels altogether well. Nevertheless the drainage tube should not be removed as yet.

After the disinfection with formol, I carefully observe, each time that I remove the appliance, the height to which the drainage tube is filled with pus. Not until I have for several times ob-

served a regular decrease in the quantity do I reduce the tube in height; when that has been the case, however, I shorten it a few millimeters. In this way it becomes completely removed eventually, and the artificial opening has an opportunity to close and to establish a barrier between the buccal cavity and the sinus.

The longer the tube is left in position the more difficult it will be to close the fistula, especially if the opening is in the roof of the alveolus. Sometimes it is necessary to make a suture in order to bring together the flaps of the wound,—I say wound because it is good to freshen the edges of the neighboring gum-tissue. These sutures are made with silk and with an appropriate curved needle.

The wearing of the plate for at least fifteen days is directed.

I dwell upon the necessity of an hermetic obliteration of the canal bored through the bone, for many times a recurrence of the disease, entirely due to the entrance of food into the sinus, has taken place. It must not be forgotten that the mouth must be kept as aseptic as possible during the entire duration of the treatment. A careful and complete cleansing of the teeth should be made previous to beginning any treatment, and the antiseptic injections which come out of the sinus into the mouth will keep the mouth in a satisfactory aseptic condition.

This I believe to be the simplest and surest manner of treating abscess of the sinus. Every time of its adoption I have obtained very satisfactory results, although in several cases that have been under my care recurrence of the disease has occurred. Nevertheless I must say that after attacks of influenza certain patients have experienced pains which disappeared without the necessity of reopening the sinus.

Discussion.

Dr. DORBAU. I must thank Dr. Poutrain for his paper, and especially for his devices, which will be of great help in the treatment of sinusitis. With regard to his lamp it seems to me that it could be replaced by the electric lamp that we all use, which does not become so hot.

Dr. Dorbau then asked Dr. Poutrain if he were a specialist on diseases of the larynx or of the teeth? Dr. Poutrain answered by saying that he was a dentist.

Dr. DORBAU. You treat inflammations of the antrum and then you tell us to send our cases to a specialist.

Dr. POUTRAIN. When the treatment that I recommend is not successful, and when a large opening has to be made; but not when the case is not of a very serious nature.

Dr. DORBAU. I am a doctor of medicine, but especially a dentist, and I consider that since we treat the cause, the periostitis, we should treat the complications that may follow.

Dr. LEBEDINSKY. The paper by Dr. Poutrain is very interesting because he has solved the problem of treating mild cases of sinusitis. I have cases of this nature that I have been treating for two years and which I believe will never be cured; hence we must make distinctions. With regard to treatment I will say that you

spoke of trephining through the alveolar wall, through the canine fossa, but you did not speak of the Luc method, which in fact is not the Luc method, for it was only introduced by Dr. Luc, but was devised by a foreign physician. It consists in the trephining of the canine fossa and the inferior meatus, and it is used by all the surgeons. It is not always successful, hence I am very happy to learn that your patients were cured by following such a simple treatment.

Dr. POUTRAIN. I only treat the simple sinusitis. If the case is very serious we should resort to general surgery, for the serious cases are beyond the limits of our profession.

Dr. GROSS. The success obtained by Dr. Poutrain is self-explanatory. The sinusitis should be divided into two groups, simple sinusitis and the one which is obstinate. In the first case we can perform the operation as described by Dr. Poutrain, but in the second case I do not believe that the treatment will be successful, and the operation of Luc will have to be made; this is a radical one and has been highly praised.

Dr. INTÉ. I have treated many cases of this nature, and I can affirm what Dr. Lebedinsky has just said,—that is, that when a sinusitis begins there are many chances of curing it, but when it is in a chronic state a cure is nearly impossible. This is what I have observed since I began to pay special attention to this question in the hospitals.

The PRESIDENT. I would like to make a few remarks on Dr. Poutrain's paper. The mechanical means that he uses are the ones that should attract the most attention. Many of us have practiced the means advised in Dr. Poutrain's paper.

Dr. Poutrain's method of securing obliteration of the artificial opening was very highly praised by the president.

CONGENITAL ABSENCE OF ALMOST THE COMPLETE TEMPORARY DENTITION IN A CHILD FOUR YEARS OF AGE; RESULT OF THE TREATMENT BY MEANS OF A PLATE.

BY GEORGE CUNNINGHAM, M.A., L.D.S., D.M.D. HARV., CAMBRIDGE, ENG.

Dr. CARLAVAU presented before the Société d'Odontologie of Paris, in June, 1898, a child, twelve years of age, whose mouth presented a series of abnormalities seldom met with in the same individual. In the superior maxilla six teeth had erupted; one was extracted and the others were of a completely conical shape. Also two molars of irregular shape were present. In the inferior maxilla two teeth of undefined form which, on account of their size, were more of the nature of permanent than deciduous teeth could also be seen. In the superior maxilla, near the left molar, a root was visible; also one in the inferior maxilla, in front of the right molar.

Dr. Carlavau thought that his case was one of total absence of the temporary teeth, but, as the Scotchman who says, "Eh, mon! I hae me doots," authors were inclined to doubt the correctness of

the diagnosis. Fortunately they found in the museum of the École Dentaire a cast of the superior maxilla taken by Dr. Sauvez, Sr., when this same patient was only two years of age. The two teeth that can be seen in this model are undoubtedly of the deciduous set, whether they be considered normal, abnormal, or supernumerary. Hence they are right in declaring that the two canines in the adult jaw are the derivatives of the deciduous teeth which they have replaced. They argued as follows: "Considering the development of the maxilla and the size of the teeth, it can be seen that the replacement has taken place in an almost normal way. This material proof can be supported by physiological reasons derived from embryology. For the six front teeth and the bicuspids the development is carried out by the intermediary of the deciduous teeth. In fact, it is from a diverticulum of the enamel-organ of the deciduous tooth that the follicle of the corresponding permanent tooth is developed. If the deciduous teeth do not exist, the permanent ones of the first series cannot develop. The molars whose presence we observe on the model cannot lessen the strength of this argument. We consider them to be the first molars, consequently derived from a direct invagination of the epithelium."

The cast of the superior maxilla of the case that I have the honor of bringing before you, taken when the patient was four years of age, not only supports the arguments referred to, but also justifies our stating that the deciduous teeth will be followed by permanent substitutes. Besides, as there are two temporary molars above and two below, I am of the opinion that the upper root and the lower one in the first case indicate, as well as in my case, the pre-existence of the four temporary molars, of which the two roots are the remains.

The cast of the inferior maxilla is different from the one in the first case, and instead of two conical teeth, two temporary molars in their normal position are present. This would make us think that the root which persisted at twelve years indicates, as in the previous case, the pre-existence of the two temporary molars.

The patient, S. G. Allan, was born April 11, 1894.

Family History.—*Maternal side:* Great-grandmother: A space on either side in the position corresponding to the laterals. Grandmother: The four lower central incisors are absent; also the two upper lateral incisors. Absence of the third molars. The remaining teeth are normal. The same conditions characterized both dentitions. Aunt: The teeth are late to erupt. The upper and lower lateral incisors absent. The molars are imperfect. The same abnormalities occurred with both dentitions. The other aunts and uncles have good teeth. Mother: The upper lateral incisors are absent.

Paternal side: On this side of the family the teeth are normal. Sisters: One aged three years has good teeth; another aged sixteen months has, up to this time, seven teeth.

The hair of the patient in question is very thin. Complete absence of eyebrows. The skin is smooth, but very easily becomes freckled. During his early childhood he had gastric troubles, but

at the age of a year he had developed enough to talk and walk. He cut his first tooth at eleven months, and the second at a year. The first molar made its appearance at two years and a half. He did not like any one to know that his teeth were unlike those of others. This is why he experiences so much comfort in wearing the artificial substitutes, which enable him to eat a greater variety of food.

Abnormalities.—I cannot record five different abnormalities, as Carlavau was able to do in his case. Those observed in the present case are the following: (1) Atrophy of nutrition: follicular atrophy. (2) Abnormality of number; *a*, decrease in number; *b*, increase in number,—that is, if the front teeth are not considered as canines, but as supernumerary teeth. (3) Abnormalities of form,—the front teeth being shaped like canines; the molars are almost normal.

History.—The mother brought the child to me when he was only four years of age. Only four temporary molars and the two conically shaped teeth (rather than canines) in front in the maxilla. She had already consulted specialists in London. These specialists were of the opinion that nothing could be done to improve the conditions present at that time. It is by no means surprising that the mother should have asked the two specialists the same question she asked me: if I could not give him something that would make his teeth grow. In spite of this question, I realized that I had to deal with a very intelligent mother, desirous of doing everything in her power for the welfare of her child.

At the first consultation I took the impression, which was accomplished with great facility, considering the age of the patient and the small size of the mouth. I was so much encouraged that I advised the mother to allow me to make him a plate. I told her that I did not know of any calcareous preparation which could do him any good; that pressure and the friction of the plate might possibly have some effect, though I very much doubted it, and that if he would only wear the plates he would be able to perform all the functions belonging to the natural organs. I also informed her that by opening the bite we should improve his appearance, and that there was some possibility that through this procedure we might bring about the development of the rami of the mandible. The mother and child were willing that I should do everything suggested. I first had his photograph taken, and then I proceeded to make several plaster casts of his face, front and profile views.

I doubted so much that he would be able to wear the plates that the trial piece was made entirely of rubber, the teeth carved into white rubber. After a few days he became accustomed to it, and the result was so satisfactory that after a few weeks a plate was made with porcelain teeth. We had much difficulty in finding the right kind of teeth. For the central incisors we ground one tooth so as to get the effect of two. It was but natural that under these conditions we had to make some changes, and, after one year, we made him another plate and opened the bite a little more.

Result.—It is easy to see the result by comparing the photographs

and casts of the face at four and a-half years and at six. The goodwill of the patient in helping us to take impressions, and to make casts of the face, is still in evidence. From the photographs it can be seen that besides the physical change, a mental improvement has also been brought about. Formerly he would confine himself to his home, and would never go out. To-day he goes out, and takes a prominent part in all the games and enjoys them just as other children do.

Prognosis.—This is the last radiograph of his head. The making of it has been a hard experience for him, and a tiresome one for us. If you examine this radiograph carefully, you will readily see the follicles of the permanent teeth which will follow the front teeth. Higher up can be seen the follicles between the roots of the molars, and also the first molars which will erupt within a short time. In a position corresponding to that of the second molars the presence of a darker spot makes us hope that these teeth will also erupt. In the inferior maxilla a different condition of things exists. Here no follicle can be seen between the roots of the molars; but he will certainly have the first molars or the second. I am afraid that the radiograph shows the teeth of the other side of the mouth, and not the substitutes.

I must here say that the radiograph has been made at the Cavendish Laboratory of Physics of the University of Cambridge with a bulb which has been very much used, and the results produced are not as satisfactory as they should be.

I could not finish this paper without expressing my thankfulness to Mr. Robin, a graduate of the École de Genève, who has succeeded so well in making the plates.

DENTAL SERVICE IN PUBLIC SCHOOLS.

BY DR. O. CERF, LIÈGE, BELGIUM.

DURING recent years the curriculum of the public schools of Belgium has been largely increased. The children receive instruction in all the branches of education; they are taught the most recent progress of natural sciences; also some of the principles of chemistry and physics.

This program, which renders the pupils mentally able to undertake the studies leading to the professions open to the ambition of the children of the middle classes, and which gives them the knowledge that will enable them to take an interest in questions of a scientific and literary character, leaves untouched all that instruction which would be calculated to develop the body and to defend it against disease.

Excepting the gymnastic course, which relieves a little the monotony of the schoolroom and which helps a little toward the physical development of the pupils, the latter receive only very vague hints on hygiene, and in this respect there is yet a great deal to be done in order to reach a practical result.

Of course, the law admits to the public schools only vaccinated

children; that, however, is the point where the government requirements stop. Despite the wise regulation in regard to vaccination, how many other things are left untouched! Do the regulations take any precautions in regard to vicious positions of the child's spinal column,—often the cause of malformed shoulders and of compressed thorax? Do they insure that the children should have plenty of light, in order to prevent in this way their eyes becoming myopic? Do they give them the fundamental principles of a good general hygiene? Do they point out the importance of caring for the teeth,—the utility of bestowing upon those valuable organs the necessary attention required for the right performance of their functions? Are the children told that the mouth is the focus *par excellence* where the germs of the most serious diseases are developed? Are they ever told that they run the risk of their lives by not brushing their teeth? Unfortunately the teacher is obliged to follow a long and overloaded program, for which he scarcely has the necessary time, and consequently it is impossible for him to teach his pupils in detail these important points in hygiene.

Efforts have been made to initiate a private dental service in our public schools. The majority of these were unfortunately made with advertising intent, and were entirely unsuccessful. It is also true that to assume such a heavy task without any remuneration was a thing above the strength of many of the originators, and to give necessary and scientific treatment gratuitously is an almost unsolvable problem.

The authorities of only one community have taken an interest in this question. Brussels has organized a dental service in the elementary public schools. This service has been going on since 1875, thanks to the originator, Mons. Bôn, and for the last ten years it has been under the direction of his son, Maurice Bôn. Eighteen schools and six annexes are under his care. He conducts his service in the following way:

M. Bôn makes an inspection twice a week. All the pupils are examined successively, class by class and school by school. The children whose teeth require treatment are sent on Thursdays to the Bureau of Hygiene, where the necessary operations are performed, and where is kept a special register in which the city records the name, age, and temperament of the child, and the operation performed. Teeth suffering from caries of the first and second degrees are filled, those suffering from caries of the third degree or from pericementitis are extracted. There is an average of 6000 to 7000 children per year who receive dental treatment. The dentist is remunerated and receives pay equal to that of the physicians of the Bureau of Hygiene.

M. Bôn, independently of this service, delivers in every school to the students of the senior classes a lecture on dental hygiene, and every student is required to make a written *résumé* of his remarks.

This service represents a great step of progress, and in spite of certain imperfections it should be the aim of every city to imitate it, though it is regrettable that a single practitioner should have to attend to the teeth of 6000 children, and that teeth suffering from

caries of the third degree should have to be extracted on account of a lack of time.

It cannot be expected that the workman should be able to defray out of his modest salary the amount required for the treatment and preservation of his children's teeth. What is the duty of states and commonwealths in the premises? To supply to those who are in depressed financial conditions the medical care that is needed. The realization of this desideratum is certainly a difficult problem. The learned societies should be at the head of this movement, and should convince the authorities that the health and the proper development of the human organism are the principal factors which make a nation strong.

The dental societies should work for the establishment in every community of dental services, which should be performed by a remunerated practitioner. They should point out through publications and lectures the dangers of bad dental hygiene and of mouths in bad condition; they should indicate the method of dental services in schools. I desire to see the organization of the following service:

In the elementary public schools the dental service should be in charge of one or more dentists, according to the number of scholars.

Every school should be inspected twice a year.

The little patients should go to the clinic on certain set days, and receive, free of charge, all the necessary treatment,—extractions, fillings (simple and compound), cleanings, and corrections of irregularities.

The dentists every year should deliver in the schools of their district lectures on the evolution and principal diseases of teeth. They should pay special attention to the hygiene of the mouth, with special reference to the cleaning of the teeth; speak of microbes which are found in the oral cavity, and indicate particular substances which are deleterious to the teeth. In the private schools the dental service would only have reference to the giving of the annual lecture.

This organization would mean some expenditure of money to the community; but, if we think of the philanthropic and humanitarian side of the question, the expense must be considered but small. I would even ask the communities to give the children two tooth-brushes and some tooth-powder every year; this would be more profitable than the books, sometimes of bad selection, which are given to children as rewards for their work.

I will conclude by framing the following resolution:

"That the International Dental Congress, in session in Paris, makes the request that the communities in all countries should organize dental services in the elementary public schools, such services to be carried out by remunerated dentists.

"The Congress desires that all dental societies work energetically in order to bring about the realization of the plan embodied in this resolution."

PERONIN (BENZYLIC ETHER OF MORPHIN) APPLIED TO DENTAL SURGERY.

BY DR. GIUSEPPE BENVENUTI, FLORENCE, ITALY.

THIS substance is known on the market by the name of *chlondrild*. It is a white, odorless powder, only slightly soluble in water. It accelerates respiration. In small doses it produces a sudden decrease of blood-pressure; in larger doses it causes death from arrest of circulation, the heart remaining in diastole.

Professor Bugolini has studied the anesthetic properties of peronin, and Dr. Juata has tried it in ophthalmic surgery. I have introduced it in dental surgery, and have found that it produces a profound and durable anesthesia. I use a one-half of one per cent. solution, in cold water, and almost without any exception the extractions are performed painlessly. The fluid should be injected deeply into the tissues, using all the care required by operations of this kind. Sometimes I use two per cent. solution, in hot water, hypodermically or by applying it to the gums for two or three minutes.

I have never observed any complications, nervous or otherwise, and, as its anesthetic effect lasts a long time, the patient never feels any post-operative pain.

TRI-STATE DENTAL MEETING OF THE OHIO, MICHIGAN, AND INDIANA DENTAL ASSOCIATIONS.

THE third triennial Tri-state meeting of the dental societies of Ohio, Michigan, and Indiana assembled in the hall of Das Deutsche Haus, Indianapolis, Ind., at 10 A.M. on Tuesday, June 4, 1901.

The meeting was called to order by Dr. George E. Hunt, president of the Indiana State Dental Association, who welcomed the visiting delegates. His speech was responded to on behalf of Michigan by Dr. S. M. Fowler, of Battle Creek, president of the Michigan State Dental Association, and on behalf of Ohio by Dr. H. F. Harvey, of Cleveland, president of the Ohio State Dental Society.

The meeting then adjourned until 2 P.M.

Afternoon Session.

A paper by Dr. W. H. WHITSLAR, of Cleveland, O., was read by the author, as follows:

DENTAL NEURASTHENIA.

Neurasthenia, the term used frequently as designating "nerve weakness" in a variety of disorders, originated, in its proper sense, in a report written by Dr. E. H. Van Deusen, of Kalamazoo, Mich. The report was a supplement to the biennial report to the Michigan Asylum for the Insane for 1867, under the heading "Observations upon a Form of Nervous Exhaustion (Neurasthenia) Culminating

in Insanity." The word neurasthenia, however, may be found in Dunglison's dictionary as early as 1833, but contemporary dictionaries, English, French, and German, did not contain the word.

To Robert Whyte, of Edinburgh, belongs the credit of first differentiating between the simple nervous state, hysteria, and hypochondriasis in a work on "Nervous Disorders," published in 1765. Medical men of the sixteenth century made an allusion to the condition now known as neurasthenia.

Within the past decade "neurasthenia" has been utilized to cover incomplete diagnosis in many instances; and what substitute was employed for it previous to the existence of this word is hard to conjecture, for no doubt neurasthenia had its commencement early in the history of mankind. It evinced its proclivities in biblical and secular history, examples being numerous.

The evidence of neurasthenia in the nineteenth century showed a great dissemination of its influences, and unless averted by systematic physical and mental therapeutics the calamity of generating a race of neurasthenics will overwhelm us during the twentieth century. It is said that Americans are prone to neurasthenia.

We suspect, first, that the intermixture of races depreciates the hardiness of a primitive race by introducing habits that are dissimilar to those which were so instilled into their natures as to be almost physiological. Or the soft-food habit; also extreme and continuous worry, as well as irregular habits, including sexual perversions, are conducive to the disease. Neurasthenia is rare among negroes. Ranney, the neurologist, mentions that the teeth of negroes and Indians are faultless, from which may be inferred that good teeth are not found among neurasthenics. Neurasthenia is quite prevalent in Russia among the Jews. The Slavs are also thus afflicted. Neurasthenia is found more frequently among men than women, but in dental practice it seems more common among women. Single men and married women are most afflicted, and the age is between eighteen and fifty years. It is occasionally found in children, but is often unrecognized among them.

All persons predisposed to neurasthenia are affected by climate. Dryness of atmosphere predisposes to nervous excitability, which is an expression of neurasthenia. Dryness causes an absorption of the natural fluids of the body, and as dry air is a poor conductor of electricity the body becomes overcharged, and thus the nervous system becomes more susceptible to internal or external excitation. Both men and animals become fretful when exposed to cool, dry winds. Extremes of cold and heat cause nervousness.

Speaking more specifically of those who are affected with neurasthenia, we may at the beginning suggest that those who by heredity or other influences have become neurotics and degenerates, or both, are most susceptible to loss of neuricity. This is noteworthy in degenerates, in whom there is an "instability of tissue which constitutes the hereditary predisposition to disease exemplified in neurotics, as well as other systemic diseases." Men and women of genius are susceptible to neurasthenia, because as a rule they are deficient both as to mental and physical capacity in some direction.

Therefore, heredity plays its part in the transmission of those influences which weaken the natural resilience of the nervous system.

Now, to inquire into the disease more carefully we should define neurasthenia. Authors differ somewhat because it is difficult to place a line of demarkation between neurasthenia and some of the functional nervous diseases which are often intermixed with it. A succinct definition is given by Prof. F. X. Dercum, who says, "Neurasthenia is a persistent diminution of nervous energy, together with an increased reaction, mental and physical, to external impressions." Dana, an eminent authority, says, "Neurasthenia is a chronic functional nervous disorder which is characterized by an excessive nervous weakness and irritability, so that the patient is exhausted by slight causes and reacts morbidly to slight irritations." In Ranney's "Lectures on Nervous Diseases" we find, "Neurasthenia is said to include all manifestations of the condition known as nervous exhaustion."

I therefore assume that it is not exactly a disease in itself, but an inco-ordinate action of neurility whereby it may be made the basis of many functional diseases. These definitions also indicate that two forces are concerned in neurasthenia,—namely, neurism and psychism. As the mental processes are highly predominant in the affection, we are reminded of the remarks of Huxley, who said, "In all intellectual operations we have to distinguish two sets of successive changes,—one in the physical basis of consciousness and the other in consciousness itself; one set which may, and doubtless will, in course of time be followed through all its complexities by the anatomist and physicist, and one of which only man can have immediate knowledge. As it is very necessary to keep up a clear distinction between these two processes, let the one be called *neurosis* and the other *psychosis*."

Neurasthenia affects the whole system. Evidences of a neuro-pathic constitution lead one to suspect nervous stigmata, and irregularities of mind and muscle become apparent. To be specific, two principal symptoms of neurasthenia are *nerve weakness* and *nerve irritability*. Clinically, there are two types of affections,—namely, the cerebral and spinal stigmata. A further analysis of neurasthenia pronounces it both as simple and that which is associated with other diseases. Disassociation of these forms is difficult, for often diseases of the liver, stomach, uterus, etc., are really dependent upon a morbid weakness of the nerves. In the simple forms of neurasthenia the symptoms are not perceptible, but are subjective. In combination with hysteria, epilepsy, etc., the objective signs are recognized. In neurasthenia the special senses are not always affected, but may become exciting causes of the disorder. For instance, we perceive congenital defects of vision which later cause change of habits and of the work of children. Neurasthenia in children is often ascribed to "overwork" when it finds its etiology in astigmatism, muscular insufficiency, myopia, or hypermetropia. The farsighted (hypermetropic) child neglects books and cares for out-of-doors sport; the nearsighted (myopic)

child does not care to play out-of-doors, and reads more than is usual or is best for him, hence we notice children of the latter class acquiring sedentary habits and becoming nervous and irritable. They lose their power of co-ordination, and neurasthenia is produced long before the cause is recognized. In this class of dental patients we find aggravated conditions which interfere with the proper care of the teeth. The same results may be said of those affected with muscular insufficiency and hypermetropia. An eminent oculist informed me that he observed more affected with neurasthenia of the above classes than those afflicted with myopia, because the latter class give up to their conditions more readily.

A large proportion of people use their brains in the struggle for existence. It is remarkable to what extent brain matter may be used before the cells composing it are exhausted; they do become exhausted, however, from overaction. Brain cells are much like muscle,—if overworked, exhaustion is produced. “Mosso, on observing that soldiers presented in the evening, after a day’s march, fatigue in the arm and leg muscles, conceived the idea that fatigue altered the composition of the blood, and he afterward discovered that the blood of the fatigued animal when injected into an animal at rest produced in the latter the characteristic symptoms of fatigue.” It should be remarked here that neurasthenia does not stand in relation to the blood as does anemia, chlorosis, etc. It affects the nervous system directly.

C. F. Hodge, in the *Journal of Morphology*, 1892, gives some remarkable experiments which were made upon animals before and after fatigue. As an illustration, the nerve cells of bees that had worked all day were compared with those of the same hive that had been resting during the same period. In all instances, and in other animals upon which the same experiments were performed, changes were discovered in the nerve cells, and the changes were always the same. It was found that the nucleus of the cell decreases in size and becomes irregular in outline. The protoplasm of the cell shrinks, and spinal ganglia are vacuolated. The cell-capsule, when present, has a decrease in the size of its nuclei. Lastly, nerve cells recover if allowed to rest for a sufficient time, the recovery being slow.

From these conclusions we infer that from the loss of cell substance there must be much waste product circulating in the blood, and, as related in the experiments of Mosso above quoted, the excessive material has a toxic action, and thus paralyzes the system. In other words, there is an auto-intoxication of the tissues from simple fatigue. There is in this a suggestion of the similarity to auto-intoxication due to indigestion, as related by Dr. Eugene Talbot, of Chicago, who states that auto-intoxication from indigestion involves the whole mucous membrane of the alimentary canal, and especially the mouth, in which there is a change of the secretions and thickening of the mucous membrane. It is stated by Professor Dercum that there is a relation between gout and neurasthenia, with the fact that “neurasthenics very often contain uric acid in great

excess. Uric acid is not, as has long been taught, a substance standing in complementary relation to urea. We have reason to believe from the researches of Horbaczewsky that it represents the chemical disintegration of the nuclein constituent of cells, and if this be true its presence in excess in neurasthenia and the relation of gout to neurasthenia acquires a new significance."

It is often reasonable to claim that the much-discussed disease familiarly known as pyorrhea alveolaris is without question an example of an overworked, exhausted, peridental membrane whose tissues are intoxicated with the excessive material in the blood currents and intercellular tissue. It is a neuratrophia or impairment of the nutrition of the nerves. Exhaustion of the peridental membrane when it occurs is often confined to one or more teeth, and is the result, first, of some irritation, and, secondly, an attempt to relieve the uneasiness produced by the irritation with the pressure against the occluding tooth. With pressure comes exhaustion, "neurasthenia localis," which eventually terminates in the graver tissue destruction. From the presence in the blood of toxic substances as an outcome of profound neurasthenia, from whatever cause primarily, it is just to argue that all tissues of the mouth which are subject to blood currents may suffer from toxic condition. The cacochymic state undoubtedly produces neurasthenic conditions surrounding the teeth, as well as of the recrementitious fluids of the mouth. Further, it is my thought that stigmatism of the enamel, as shown by the so-called atrophied spots and pits, are the relics of trophoneurosis,—an impairment of nutrition which may be due to exhaustion. This condition is mainly found in third molars.

"Anesthesia does not exist in neurasthenia" (Dercum), hence we may expect undue sensitivity of the teeth and tissues of the mouth. The dental pulp readily responds to external stimulation, and wrathfully expresses its anger in painful elements. As neurasthenia is not a constructive disease, but a symptom of exhausted energies, the pulp of the tooth, if subjected to continued irritation, dies without the fortifications of secondary dentin and pulp-nodules being formed. The pulp is easily irritated in neurasthenics, and exquisite sensitivity of the dentin is often noticed, many times to the regret of the dentist. Bridge-work dependent upon distant anchorages causes strain of the peridental membranes, producing exhaustion of the cellular elements and eventually their destruction. With this the alveolar processes give way, and, being no longer supported in its place, the bridge is lost. Worriment concerning dental tissues conduces to neurasthenic conditions.

Neurasthenia is one of the symptoms of decay, or, expressed otherwise, decay of teeth is the result of those conditions which predispose to decay, and which are concerned in the biochemism of the tissues. Ranney, the neurologist, states that "premature decay of the teeth has been brought forward as one of the most striking evidences of the steady increase of the constitutional impairment which has followed our present methods of living." Such is this condition that neurologists generally recognize decay of the teeth as a sign of depression of the nervous system,

Dr. Michaels, of Paris, in his paper read before the International Dental Congress in 1900, refers to saliva as an indicator of the decay of the teeth, also of the diathetic and organoleptic conditions of the body. The essay declares that the tissues and secretions depend upon the blood plasma; a dyscrasic condition modifies the forces of the economy and produces local or general manifestations, taking place alternately and successionaly. Abnormal vital processes end in two ways,—hypoacidity and hyperacidity. In hypoacidity there is a vital overactivity, resulting in the contagious diathesis, as in tuberculosis, syphilis, etc. In consequence of this state, it is evident that nerve exhaustion is easily acquired. Dr. Michaels's experiments show, too, that dental decay is more prevalent in this state,—hypoacidity,—and an indicator of the same is the relative proportion of ammonia being greater in the saliva than the sulphocyanids. A very important item in the essay was that the activity of dental decay is modified by the diathetic period. Now, in hyperacidity we find a decrease of vital activity, but an increase of acidity of the blood, and an accumulation of acid products which in their turn poison the system. The conclusion to be derived from a study of both conditions is that there may come a neurasthenic state, either from hypoacidity (overactivity) or hyperacidity, in which waste products accumulate; that biochemistry of tissues is a part of life's processes, and disease conditions of every tissue are dependent upon them.

It is not desirable to make this paper too lengthy; permit me to conclude with some few observations upon treatment.

Treatment.—In the treatment of neurasthenia there are two elements to consider,—the patient and the dentist himself. In both we sometimes find the same conditions; that is, worry, fear, exhaustion from temperature, deficient respiration, and psychic disturbances. The dentist is exhausted by continued physical labor and anxiety for the care of those whose nervous systems are exalted and intractable to common measures. He is compelled to reduce psychic disturbances by putting himself *en rapport* with the patient. This signifies a depletion of his own neurodynamia or nervous force. The first principle of this treatment is to secure *passivity* of the patient. Rest is the *sine qua non* treatment for neurasthenia. Upon this fact Dr. Weir Mitchell based his famous treatment of neurasthenia, known as the "rest cure." In the performance of dental operations there is no opportunity to follow in detail the rest cure for lack of time. We produce, first, as above stated, passivity; then comes *faith*. With a basis of passive or restful thoughts and the concurrence of faith or confidence in the dentist, he (the dentist) now is able to suggest orally, or through the subjective mind, his control of the sensation of the body. This proposition is based upon the hypothesis that man has two minds; that is, one the objective mind and the other the subjective mind; and also upon a subsidiary proposition which relates to the subject of psychotherapeutics,—namely, "the subjective mind has absolute control of the functions, conditions, and sensations of the body." It is believed that the above propositions are the fundamental elements

of the whole domain of psycho-therapeutics. Where is there a dentist who has not felt the need of this power and who does not indeed use it, unconsciously or otherwise?

When neurasthenia is recognized in a patient who applies for services, prudential measures for the care of the teeth are necessary. If there is any condition that requires care, it is at this period, for many cases of neurasthenia drag out for years, and the patient eventually dies of some intercurrent disease. As shock is often one of the causes of this disorder, all subsequent operations are under restraint, and should be in many cases only temporizing. It is advisable to prepare the patient for an operation by suggesting a period of rest previous to the visit,—a good night's rest; or the use of medicaments, as a sedative or stimulant, as the case requires, is frequently desirable. Strychnia, potassium bromid, antipyrin, morphin (used rarely), are some of the most reliable remedies. Hot water as a drink before and after operations is one of the most valuable remedies, and its value may be enhanced by the use of some of the milk foods of which we have familiar knowledge. Good food is at all times essential to the well-being of any individual, and it has double value in neurasthenia. Good sleep, good food, are health-restorers.

In local neurasthenia of parts of the body, for such may occur, we believe the conditions of the part suggest the treatment.

It must be remembered that there are different phases of neurasthenia, and a specific treatment is not known.

Finally, let it be said that this paper does not exhaust the subject of neurasthenia, and it is hoped that the attention drawn to it herein may result in further investigation.

Discussion.

Dr. E. T. LOEFFLER, Saginaw, Mich. At our first Tri-state dental meeting, held in Detroit in 1895, I read a paper on "Habit Spasms," a form of reflex neurosis, and ever since that time I have been more or less interested in diseases of the nervous system. The main points of the subject have been covered so thoroughly and in such a scholarly manner by the essayist that little room is left for discussion or criticism.

According to Dr. Loomis, in his work on "Practical Medicine," neurasthenia, or neurasthenia spinalis, as he terms it, is a functional weakness of the spinal cord, or, as Rosenthal calls it, a depressed form of spinal irritation. It is commonly known as nervous debility, although nervous exhaustion is the better term. Rolando, Luys, and others have advanced views concerning the cerebellum that may lead to this organ being regarded as the seat of the disorder. Some authors claim that it is an anemic condition of the spinal cord, but its morbid anatomy is not as yet determined. Erb claims that it is not a manifestation of hypochondria, and that, although often combined with it, it is to be regarded as distinctly of spinal origin.

Beard, Leveillein, Bouveret, Loewenfeld, and Binswanger have written exhaustively upon this subject, but not all of us are so fortunately situated as to have access to these authors. My principal

source of information has been a recent work on "Diseases of the Nervous System," by H. Oppenheim, M.D., professor at the University of Berlin (second edition, 1900); also an article by Dr. Loomis in his "Practical Medicine." The writer has predicted that during the twentieth century there is a possibility of our being overwhelmed with a race of neurasthenics. The number of its victims is certainly on the increase, and this leads me to emphasize the point that neurasthenia, as well as all similar diseases of the nervous system, should claim our most thoughtful consideration.

We cannot all become neurologists, but we ought never to forget that we are students as long as we live. Dr. Whitslar has made it possible for you to have a clear conception of what neurasthenia really is, but unless we make a practical application of what we have heard his effort in our behalf has been in vain.

I am of the opinion that neurasthenics should be treated by the specialist in nervous diseases before we do anything for them. To be of the greatest service to our patients we should become experts in the diagnosis of the disease, if nothing more. We should take up in order, first, family history; second, general etiology; third, previous history and onset of disease; fourth, subjective, and, fifth, objective symptoms. These steps need no special explanation, but I would like to call your attention to the fact that many points of aid in the diagnosis of a nervous affection are either ignored by the patient or not thought of sufficient importance to mention until his attention has been called to them, therefore great care should be exercised in taking the history of the case. It is advisable for the beginner to observe a fixed order, as mentioned above, in his examination; when experienced, it is not necessary. The general etiology should be ascertained before the onset of the malady is sought after. It is true that there is always experienced some difficulty in making a close distinction between the slightest grades of this disease and certain phenomena which are still regarded as being physiologic, since persons in their normal conditions may experience symptoms which, when more strongly marked, are characterized as neurasthenic.

I would like to add, under the head of treatment, the words of Professor Oppenheim: "Do not overtreat your cases. In recent cases, if it is possible to remove the injurious factors at the base of it, it is advisable not to undertake any positive treatment. It does much good to the patient also if he sees and hears that the physician, although he does not doubt the reality of the disease, trusts to nature for a cure. How far one can go in this respect cannot be laid down by rule. I know cases of this kind in which the patient, after he had gone through different treatments in vain, returned to a rational mode of life and recovered." At last he was healed by the universal balsam of ever-healing nature.

Dr. BARNES, Cleveland, O. The writer is to be complimented on his paper. He is one of the pioneers in this direction, and I sincerely hope that he will persevere and delve deeper into the subject. I also hope that the young men here will take this matter up and do their best to solve this problem, the successful solution of which will

do away with so many of the troubles under which we have labored in the past.

The essayist speaks of the change of fluids. We note in these cases that dental decay, especially in persons over twenty years of age, is most frequent in the third molars; we seldom have decay in the lower incisors. There we have just as much of the fluids as in other parts of the mouth, but the constant washing of the fluids back and forth by the action of the tongue and lips prevents their remaining and becoming vitiated as they are in connection with the other teeth.

The essayist speaks of the importance of rest, and I want to discuss that from the standpoint of the dentist. If by resting he means to go home and lie down in a hammock or on a feather bed, or something of that kind, I take issue with him. My way of taking a rest in the summer time is to go out on my bicycle or push a lawnmower. I find in this a rest and a change. I could not lie down in a hammock and rest. I could not get help in that way when nervously tired, but by exercising my muscles I can tone up my system, and I find that as I tone up the muscular system the nervous system is also benefited.

I remember a few years ago I was on the verge of nervous prostration. I was so situated at the time that I could not go away and take my usual vacation. So I went with my family to the bank of Lake Erie and tented out, and we followed the usual custom of campers of having a fire in the evening. It was our pleasure to go out and gather up driftwood and logs. We had our axe and our maul, and we would split up the logs and haul them to the fire. The result was that that summer I did not spend an hour away from my office during office hours, but took my outings in the evenings after four o'clock, and I was in much better condition at the end of the summer than I have been other summers when I have gone off on a vacation, tramping about some city seeing sights and all that. I think that if we took up this question of rest and exercise it would be of great help to us and to our patients.

Dr. DOUGLAS, Romeo, Mich. I want to say just a few words by way of suggestion. An eminent clergyman of our place was taken with so-called neurasthenia. After he had been running down for three or four months he had to give up his pastorate and go away for a rest. He met a physician who discovered that he had a tapeworm. The physician gave him some medicine that carried away the tapeworm and in removing the tapeworm completely cured the clergyman of his neurasthenia. Many times I have seen children apparently suffering with neurasthenia, and on relieving them of worms, sometimes pin-worms and sometimes lumbricoids, sometimes both together, the symptoms of neurasthenia would entirely disappear.

About the use of hot water, which was referred to in the paper. At one time I commenced work by the chair at half-past eight in the morning and worked until half-past four in the afternoon, stopping just long enough at noon to take a drink of milk, and then went right back to my chair again. (My office is adjoining my

house.) I worked upon one occasion until I thought I had neurasthenia. I had to drink three cups of hot water before I could eat any supper, and in one hour I felt as well as I do to-day. When you are exhausted from working at your chair and feel as though you cannot go on any longer, when you are so tired that you can neither eat nor rest, you will find a glass of hot water very reviving.

Dr. H. A. SMITH. I am reminded that last Friday evening, in our local society at Cincinnati, we had a new idea presented to us by Professor Cassidy. The subject under discussion that evening was the recurrence of caries under good fillings. Dr. Cassidy said that one of the waste products of nerve tissue was lactic acid. Then he reasoned this way: If nerve tissue produces lactic acid, why does not the pulp, when it is overworked, when it is subjected to a low degree of irritation, produce lactic acid which in turn may produce the recurrence of caries? It was a new idea to me.

The essayist presents an important subject to us in the practice of dentistry. I was particularly pleased with the practical turn which the paper took. Dr. Barnes says he rides a bicycle to obtain rest. I do not want a bicycle. I want to lie down on my back or recline and read something light. Speaking for myself, I think that when a man is exhausted nervously nearly all physical exercises are too violent. Therefore I say that positive physiological rest is better.

Dr. BOGUE. Among the remedies referred to by Dr. Whitslar there is one which I have been using for some time with good results. That is a preparation of chloretone, put up by Parke, Davis & Co., of Detroit. They put it up in capsules of five grains each. It has helped my nervous patients many times and there were no bad after-effects. Where I have given as much as fifteen grains, the patient at the end of a sitting would be nearly asleep. In one case a boy of fifteen years required considerable effort to waken at the end of a sitting. In this way nervous patients escape the strain to which they would otherwise be subjected, and I find no unpleasant after-effects whatever.

Dr. WRIGHT, Cincinnati, O. I know very little about the subject of neurasthenia and very little about its treatment, but I am always interested in papers that discuss the relationship between diseases,—the interdependence of one disease upon another. During the last few years there has been an increasing interest in these subjects. We are getting our minds above mere mechanical operations, such as filling teeth and making plates, and are looking a little further into the causes and the relationships which exist between even widely separated diseases. It seems to me that when you are thinking about a disease you should also think about the other side of the picture,—the efforts of nature to resist that disease; and even in the consideration of caries of the teeth, a local disease, we are appreciating more and more the physiological efforts of nature, back of the pulp and back of the caries, to resist the disease.

The subject of neurasthenia is becoming increasingly interesting to us. I believe the first writer on the subject in America was Dr. Geo. M. Beard, who some years ago wrote a popular work in which he showed that professional and business men, and many

others, are affected by this so-called neurasthenia or nervous exhaustion. He even called it an "American disease," and I believe it is known abroad as *the* American disease. His observations were mostly clinical. Now special experiments are being made in laboratories in regard to these nervous diseases, and in the pathological anatomy of the tissues themselves to which Dr. Whitslar referred.

We operate on a *so-called* local disease, but it is a question whether there is any disease which can be purely local. We must study the diseases of the nervous system. Dr. Whitslar treated the subject in two ways; first, as it affects the patient, and, secondly, as it affects the dentist himself,—and we are equally interested in it on the clinical as on the laboratory side.

Dr. TAFT. Nerve fatigue, nerve-tire, is a question interesting to all of us. It comes in some form or other to everyone. The fatigue which occurs after severe exercise, though it may be but for a brief time, pertains to the nervous system, and it is of interest to everyone. As to what remedies will best serve the different cases and best repair the lapses in this respect, of course there may be a variety of opinions, but I think this principle should be observed so far as possible,—that with the least possible medication we should endeavor to persuade nature to restore the nerves to their normal function. A great many things are employed for this purpose, but I think it good, whenever possible within a reasonable time, whenever there is not some manifest lesion or some manifest breaking in function, to rely largely upon nature, helping nature so far as may be without active medicinal agents. So that in most cases of this affection, especially where it is not chronic, the proper treatment is to give nature an opportunity to restore the function of the nervous system; then, ordinarily, all will be well. As has been stated, if one will cease from any exercise, simply resting by lying down, it will often be surprising how thoroughly and readily reparation and restoration are made without any special medication. I think we are all too prone to rush into the employment of medicinal agents here, as well as almost everywhere else. Of course, there are emergencies when proper medication must be employed in this as well as in other things, but ordinarily nature should have an opportunity to do what she can in the way of rest, to restore normal conditions. We have an almost innumerable list of preparations for restoring vigor and strength, but they should be employed with great caution. If, after giving nature an opportunity to effect the repair, she fails in the accomplishment of that, if she needs a little help, or considerable help, then it should be intelligently given.

Dr. N. S. HOFF, Ann Arbor, Mich. I do not know whether the author of the paper intended to convey the impression that all undefined local diseases are traceable to nervous or systemic disorders of the body or not; that impression certainly was conveyed to my mind by his paper. I do not think that is always or generally the case. Many of the disorders which we find in the mouth are entirely of local origin. We are familiar with the discussion which has gone on for years in regard to the etiology of that troublesome disease, so-called pyorrhea alveolaris, and we are still undecided as

to whether it is a systemic disorder or one which has a local cause. Some claim that it is entirely local in its origin. Perhaps after we have studied this subject of the disorders of the nervous system more thoroughly we may find that it is systemic not only in its origin, but that systemic disorders have much to do with its continuance. I know very well that conditions of diet and habit of life have much to do with its cure when accompanied by such practical and technical proceedings as we are accustomed to employ in connection with its treatment. It is hardly possible to cure pyorrhea alveolaris without technical operations, and yet, if not cured, its course may be very much modified by technical operative procedures. It is a question in my mind whether we may hope to decide definitely when these disorders are systemic and when local in their origin. We may in some cases, in others we cannot. There are other local diseases that are very much exaggerated by general nervous derangements, and their treatment is very much modified by a knowledge of systemic disease. I do not know how dentists are to qualify themselves to make a proper diagnosis of every patient who comes into their care with such local disorders, which they are expected to treat. How are we to become qualified to decide whether a person is a neurasthenic, and, if so, what the character of the nervous disorder may be? Physicians are not always able to do this; the very best specialists in nervous disorders are not able to diagnose these conditions satisfactorily. If they cannot definitely diagnose these conditions, how are we ever to hope to accomplish anything in that direction? I do not mean to throw any cold water on investigations of this subject. I should like very much to study it myself if I had the time, and I trust Dr. Whitslar may go on with his investigations and come to some practical result that we can utilize in our daily work. It looks to me like a very large subject indeed.

A member of our profession who is here to-day related to me a case under his care which he was unable to satisfactorily treat. It was a case the like of which all of us, no doubt, have had, and perhaps it will illustrate the subject under consideration. It was the case of a lateral incisor tooth from which he had removed the pulp. He had thoroughly treated it according to the usual custom, and filled it repeatedly, and as often he had been compelled to remove the filling on account of the recurrence of pain, which he was not able to account for. From his statement of the case it seemed to me that he had taken every practicable precaution. He had disinfected and sterilized the tooth and filled it in a proper manner. I could not criticize his procedure in any way. It occurred to me that possibly there might be some systemic disorder, and I suggested to him that possibly there was some systemic disease, something hereditary in the family that might give some clue as to the diagnosis of the condition and possibly might lead to some new light in the method of treatment. He said that there was scrofula in the family. Of course, that threw a new light on the case at once. The knowledge of such a fact as that is of practical importance to the dentist, because it may be that a local condition which

he is compelled to treat, or lose his reputation in his community, is the result of some systemic disorder that he is not in a position to diagnose or to cure. Such cases must be referred to the family physician or to some one capable and competent to treat them. I think we may possibly enlarge the area of the field of our work, not by attempting to solve these riddles ourselves, but by shifting the responsibility for the treatment of these systemic conditions to the physician, with whom it properly belongs.

Dr. SAGE, Cincinnati, O. The subject of neurasthenia is of great interest to us as dentists. No class of professional men are called upon as we are to deal with sensitive nerves without the assistance of sedatives or anesthetics for such operations as those that require most of our time and attention. When the surgeon is about to perform any important operation he has the aid of an anesthetic. He may give chloroform and keep his patient under its influence for any length of time. He may give nitrous oxid or any other anesthetic that may satisfy his convenience, either a local or constitutional anesthetic, and accomplish for his patient while in a state of insensibility that which we are compelled to accomplish for the patient while in the full possession of all his faculties and responsive to the slightest appeal to his nervous system. So, I say, there is no class of professional men who are tried as we are by the nerves of those to whom we minister. Therefore this subject comes home more closely to us than to any other body of professional men. I believe there is no other one cause that operates as this does to make dentists entering the profession regret that they have ever chosen the calling of dentistry. I confess that after I had been practicing a few years as an operator,—and I devote most of my time to operative dentistry,—I found it so trying to my nervous system that I regretted that I had ever gone into dentistry. Of late years I have learned in large measure to overcome that.

Very often the dentist has himself to blame for a condition which invites from the patient manifestations of nervous disturbance or trepidation or lack of confidence in the operator. If the dentist himself is a nervous individual, he often invites a similar response from the patient, so that the two are not *en rapport*. They rasp each other's nervous systems and exasperate each other. Oftentimes when you begin to work for a patient you will discover, if that patient is of a nervous temperament, that there is something about him which repels you. You feel you do not want to work on that patient. It is this that has led to investigations into the field of hypnotism and into other fields that promise relief for the dentist. For it is not to be claimed that our sympathies go out entirely to the patient or that we care first of all for the patient. Of course, we sympathize with him, but those of you who are able to recall your college days will remember that there was among the students an heroic spirit, a spirit that made them seem to glory in being severe in their operations. You remember how you have seen them drive wedges between the teeth with a nonchalance which came only of a consciousness of the fact that their fellow-students were standing by admiring their heroism. They cared nothing if they did hurt

the patient. A great many dentists have the same feeling to-day. Now, I say the first question for consideration, when it comes to this question of neurasthenia, is the effect upon ourselves. The patient has to remain in the chair an hour or two, but we have to stand by the chair six, eight, and ten hours a day, working for patients of all degrees of nervousness. We are the ones whose sympathies are drawn upon, whose nerve force is exhausted the most. You work for one patient an hour or two hours and that patient leaves your chair exhausted. That patient has drawn on your nervous force and you have become exhausted, too, in a measure. After you have dismissed that patient you call in another, perhaps equally nervous, and you must go on and work for another two hours. And so it goes on all day long. Is it any wonder that dentists break down early in their practice as operators? So I say that this question concerns us perhaps more than it does our patients; for, do what we may, we cannot always save our patients from pain. Constitutional treatment and other means which have been suggested will help. A large field remains to be developed, and no doubt the time will come when patients will not have that dread of the dental chair which they have to-day, because we shall be able to perform our operations with comparative painlessness. We can do so to-day in a measure. It is not within the line of this discussion to refer to the means which we now have for preventing pain to the patient. The point I make is that we as dentists have to consider what we are going to do for ourselves, to prevent this strain on our patients which results in nervous collapse on their part and disqualifies them from being operated upon, and disqualifies us from operating upon them.

Now, the first thing that the dentist should do for himself is to see that he is in as good physical condition as may be. Being in good physical and nervous condition himself, he can stand a great deal. It is more a question of properly caring for ourselves than some conceive. When it comes to operating all day long, the dentist should be prepared by a good night's rest. How many times does the dentist go out to some social function at night and remain until ten, eleven, or twelve o'clock, coming in to get but a few hours' sleep and perhaps to sleep not at all, lying all night long half awake, so that the slightest thing disturbs him? Then in the morning, after a cup or two of coffee to brace him up, he starts in with his nerves on edge, and fills teeth all day. It might not be so bad if he could select his patients,—if he could say, "In the morning while I am fresh and full of nerve I will work for Miss Smith, who is a bundle of nerves, and I will work only one hour for her, and then I will work three hours for Mr. Jones, who has no nerves at all; by which time, perhaps I will be prepared for another nervous patient." That would be all very well if it were practicable, but we cannot do that. We have to take our patients in the order which best accommodates them, oftentimes; the appointments must suit their convenience as well as ours. Therefore, I say, we must be in as good physical condition as possible to stand the strain.

I place great confidence in the restorative force of plenty of sleep.

I am not an old man, but I have been operating thirty years, and I find that now, with proper care of myself, I can render better service to my patients, so far as inspiring them with confidence and soothing their nervous irritability is concerned, than I could when I began to operate. It is not for me to say that I can do better work, but I can make it easier for them, and I have found that the getting of a sufficient amount of sleep has been of the greatest advantage to me. Of course, it all depends on temperament. Our physicians say that two hours' sleep before midnight is worth four hours after midnight. That is probably true. If you can get to bed at a reasonable hour in the evening and sleep soundly, you will find that you can operate much better the next day, that you have much better endurance, and if you are temperate in your habits generally and keep yourselves in the best physical condition you will not be so worn out by your patients.

Now, as regards our patients, we can do much for them. We need not prescribe for them, but there is a great deal in the tactful management of them. If a lady comes to you in the morning and says, "Doctor, I had a great notion to telephone you that I could not come this morning; I have been out late at night and I do not feel equal to this engagement," if she tells you that, you had better give heed to what she says, and not attempt to do anything for her that morning. Postpone her engagement if you can. Of course, this inconveniences the dentist, and we do not like to have our patients break appointments; but by all means postpone your engagement unless you are certain you are able to hypnotize her or in some way to control her nerves so you can do her justice and do yourself justice.

We talk about the failure of fillings and the failure of operations generally, and we look for the causes of those failures; we search through the realm of bacteriology and in other directions to discover the causes of the failures. Oftentimes failures are caused by the fact that we have not been in any condition to work for the patient. We have not been quite conscious of it, and we have attempted to put in difficult fillings when we were in a state of nervous irritability and exhaustion, and could not do the patient justice. These things are all worthy of consideration. When a patient comes to me urging that he is not feeling equal to the strain of a proposed operation, I often suggest that he come another day. And here is a suggestion that is worth something. It is not by way of hypnotism, but it is by way of suggestion. Tell your patient to go home and try that empirical remedy, chalk to the teeth, to correct the acid condition, and to come back two weeks later. I have often found that efficacious as a suggestion appealing to the patient's imagination. I have done successful work for the patient after that suggestion that could not have been done at first. I often transfer my appointments to a later date. There is everything in the study of these things; we must study human nature.

Then there are other cases where a little firmness and positiveness and a little managing of the patient will work wonders. Some patients come and make a pretence of not being able to stand an

operation, when if you simply say, "You have made this engagement with me, you have put me under obligation to reserve this time for you, and I insist that you sit quietly and let me do what is necessary." If you only know your patient, you can do that sometimes successfully. I have not always succeeded; I have driven patients away by saying that to them, and they have gone to other dentists. You cannot always help those things. You will lose patients no matter what you do. Of course, confidence is a very important thing; but the most important thing is that we ourselves be in good condition or we cannot do justice to our patients or ourselves.

Dr. AMBLER, Cleveland, O. The statement was made in the paper, and it was seemingly taken from very good authority, that the negroes and the Indians had teeth which were nearly faultless. Now, I do not know whether that statistician knew his business or not, but I am very strongly inclined to believe that he was incorrect, because the latest works that we have on dental pathology tell us that Africans have and even the ancient Egyptians had decayed teeth, alveolar abscess, and pyorrhea alveolaris. So I think that gentleman made a mistake. I do not arraign Dr. Whitslar, for he made the statement as a quotation, but I do arraign the man who made the statement originally. Dentists do not accept it as a fact.

There was another statement made in the paper which I think every man here who has done any bridge-work will confirm. That was with reference to the attachment of four, five, or six teeth to two abutments, and some of you have made a good many of them. I say in such a case as that the pericementum is overworked, and no dentist with any sense at all can expect a piece of bridge-work to last for any length of time when so great a strain is placed on two abutments. He is just taking his patient's money and not giving an equivalent for it. I am very glad to have had that point brought out.

I do not believe any dentist can ever believe thoroughly in Christian science. Ours is too practical a profession.

I think it has been very fully developed here by two or three different speakers that what is rest for one man is not rest for another. I claim that every man after his day's work or his week's work or his month's work must find a rest of his own for himself. One reason why a man rests more when he is lying down is because his heart beats five, six, or seven pulsations less in a minute than it does when he is standing up. So he gets more rest lying down. But one thing which should not be done when you are lying down is to read. Every oculist will tell you that you change the focus of the eye and the position of the muscles so much in reading when you are lying down that there is a strain on the eye all the time, which you do not get when you are sitting or standing. Neither should a man read books or papers on any kind of a car, whether it be a street car or a steam car.

As to hypnotism, I find that in almost every class of graduates from a dental college there are some who have the hypnotic power to a greater or less degree. In the class in which I graduated from

the Ohio Dental College there was a member who could hypnotize anybody in that class. That man has gone out and practiced dentistry, and he is a successful man. He uses that talent in a quiet way when he thinks it is best to do so. If a dentist is going to use hypnotism at all, that is the right way to do it.

In regard to remedies which produce no toxic effect, but which act upon the nervous system, I have another to suggest. I have found that by administering to the patient anywhere from ten to twenty drops of the fluid extract of Jamaica dogwood in half an ounce of water it would act as a nervous sedative. This to be given about ten to twenty minutes before you begin to operate. This drug allays nervousness, produces muscular relaxation, affects the brain similarly to opium but leaves no unpleasant results. It is not unpleasant to take, and only one dose should be given at a sitting. When the patient begins to feel drowsy, then go ahead and excavate the sensitive dentin.

Dr. EMERY, Newark, O. I wish to refer to one phase of this subject,—the question of energy. Now, lying down or any other form of rest will of necessity demand as its complement the exercise of energy, or else it will produce a nervous condition. What would rest one nervous patient would be exceedingly tiresome to another. The general nervous condition of the person must determine the sort of rest that his nervous system needs. What would rest one would tire another. The expenditure of energy does not necessarily produce nervous exhaustion. While we work hard and stand in one position, or one condition of things may exist for so long a time that we may become exceedingly nervous or worn out, yet a simple change of position or occupation may be the only rest which is called for. We must not conclude that we are all alike.

While we may work ourselves up to a pitch of nervousness by having a fidgety patient to work for, yet we can, by giving our energy and our mind to controlling ourselves, lessen that condition of things to a marked degree. I think that allowing our temper to get the better of us, or allowing little things to annoy us, is one great cause of nervous exhaustion. Of course, we know that in some parts of our work a moment's inattention, or the slightest variation, will cause us a half-day's work to rectify. So that causes us to become stirred up. But we should fight against that. I find I get more rest from learning how to control my temper under such circumstances than from any other one thing. When a dentist takes a plate out of the vulcanizer and finds it porous through and through, or when he finds the facings cracked on a bridge, of course it is discouraging and trying to the temper; but if he could remember to whistle or sing at that point he would save himself a wonderful amount of nervous exhaustion. I find in my case that has helped me more than all the stimulants I could possibly take. When I have an accident in my laboratory I find the best thing to do, even if I have to force it, is to whistle. It is the best remedy you ever saw in your life. Whistle or sing, or do something other than swearing and tearing up and down the floor and telling yourself what an up-hill business dentistry is. This temper

of ours is the index to our nervous system. I do not chew, I do not smoke, and I do not drink coffee. So I have none of those things to disturb my nerves, and I have found, since I learned to control this temper of mine when I have met with accidents or difficulties, that I have gotten along ten times as well, and I can rest at night. Why, after the exasperations of a day's work, when things have not gone well, I have before now gone home so mad I could not sleep, and got up red-headed in the morning thinking about it. But that does not pay. It is possible to keep your temper. And there is no one who will notice it as quickly as your patient. Of course patients are often very trying. A patient will come upstairs and begin to complain that he is all out of breath and suggest that you ought to have your office on the ground floor. Then you get him in the chair and he twitches at the first movement you make. But you can avoid much of that by getting the confidence of the patient to start with. Do not go at a nervous patient as if you were digging coal, but go about it in a humane style, as though the patient was going to pull a tooth for you. You know the medical profession are the hardest patients to work for. I can say that because I studied medicine myself. They seem to be acquainted with these things, and their very knowledge of the subject seems to make them naturally afraid of a little bit of pain, so that they hardly know what to do with themselves. If you want a patient with nerve, do not take a man, but a woman. We men ought to be ashamed of ourselves. We are the biggest cowards in the world when any dental or surgical operation is concerned. I have had men who could hardly stay between the arms of a chair and the sweat would run from their faces when having a tooth extracted; but take a little frail woman who you would think was almost ready for the grave; and she will let you take out a whole denture with hardly a demonstration. Is it nerve force that does that? I say the energy that we naturally expend day by day is not the cause of our nervous depression. Resting too much or for too long a period will give us just as much nervousness as the most severe exercise. Consequently, we must equalize these things. One suggests the other; rest suggests work and work suggests rest, and what would rest me might not rest you.

I regard this as a very important subject in dentistry, and one which is very difficult to deal with. We cannot make any satisfactory explanation of some of the nervous conditions with which we meet.

Dr. WHITSLAR. I was very much struck, as I always have been, with the remarks of Professor Taft in reference to the treatment of diseases. We all know that the more experience we have, the more clearly we see that it is better in our treatment of disease to rely as much as possible upon the efforts of nature, which is the best restorer. In my paper I did not mean to intimate, as suggested by Dr. Hoff, that certain conditions were always due to systemic disturbances. We do have diseases which are local in their origin, and I believe oftentimes so-called pyorrhea alveolaris is merely a disease produced by an extraneous cause; but I believe also that it

may be produced by a systemic condition, and I believe both local and systemic causes may be instrumental in the production or continuance of the disease. I always remember the teaching of one of my old professors that "No result is the effect of any single cause, excepting the first Great Cause."

Dr. Emery referred to the importance of keeping our tempers as something which has much to do with our placidity and well-being. Anger is the root of aggressive passion. Worry is the root of the cowardly passion. We have more to do with the condition known as worry, that cowardly passion of which jealousy and fear are the children.

There is a great desire on the part of all of us to know the best thing to do for our patients in each individual case. In order to do this we must consider all those conditions which come under the head of suggestive therapeutics. This term covers every phase of treatment under the various heads of faith cure, mind cure, Christian science, spiritualism, mesmerism, and suggestive hypnotism. They are all one and the same thing, and we all practice this treatment. If we did not, we would be incapable of performing our duties as we should perform them, and we should drive patients away from us.

Now, there is one thing of which I spoke in the paper, one thing to fear. That is that in using this power we do not overcome ourselves. We have within us a subjective force, a subjective mind, if you please, which enables us to control our conditions, and in that way we auto-suggest; that is, we suggest to ourselves how we may control ourselves. For instance, as has been suggested here, we have a condition in ourselves that is tearing us down. We are nervous, we are tired. Now we have the power, while the objective mind is working, we have the power of suggesting to ourselves that we are feeling good, and if we do this, then when we arrive at the conclusion of the operation we are not so exhausted.

The suggestion made by one of the speakers of whistling or singing when mentally disturbed is one of the best that can be made. I know a gentleman who is an expert athlete, who is engaged in teaching athletics to boys and young men. He has made a scientific study of athletic conditions and the care of the human body. I asked him the other day, "Why is it that the teeth of athletes are always so sensitive?" Athletes are capable of being pounded in their faces, their arms, or their heads, and without inconvenience will stand blows which would give great pain to ordinary people, but they are very apt to have extremely sensitive teeth. The explanation given was that the pulps of teeth are not exercised and not wrought up to the condition where they can withstand pain as the muscles of the body are, and the nerve reflexes are very much less in the pulps of the teeth. So they are not capable of withstanding the pain. The pulps have not been exercised and therefore the resilience is less and they have less power of resistance.

(To be continued.)

REPORT OF THE FOREIGN RELATIONS COMMITTEE OF THE NATIONAL ASSOCIATION OF DENTAL FACULTIES FOR THE YEAR 1900-1901.

(Reported and adopted at the eighteenth annual meeting held in Milwaukee, Wis., August, 1901.)

THE past year has been an exceedingly active one for the Foreign Relations Committee, and the correspondence has been very large. We believe that the influence of the National Association of Dental Faculties has been materially extended during the year, and the good work that has been accomplished by it is becoming more widely known both at home and abroad.

The association has given its Foreign Relations Committee jurisdiction in all foreign educational affairs that affect its interests. This we do not understand to mean that we can dictate what shall be the foreign policy to be followed, but that the committee may advise during the interim between the sessions, reporting its action for approval or disapproval at each annual meeting. This does not in any way interfere with the duties of the Ad Interim Committee, as the authority of the latter has never embraced matters in foreign countries. At the last annual meeting the committee presented a partial schedule of equivalents to be given for attendance on foreign courses of study. The association accepted that and enacted that advanced standing in American schools should only be given foreign students in accordance therewith.

There is a rule of the association that any legislation vitally affecting the members shall not go into effect for one year. This is a wise restriction, for the announcements are usually issued before the time of our annual meeting, and enactments that might be in conflict with the terms legally offered to students could not well be enforced. Your committee found that some foreign students had already been accepted by schools, and consideration given to foreign instruction which might be in conflict with the new regulations. It was therefore deemed best not to give any rulings affecting the annual term for 1900-1901.

But many loyal schools, those whose governors were most anxious to improve the standard of American professional education, have referred all their foreign applications to the committee. In this way it has been learned that foreign students have asked for advanced standing because of attendance, in some instances, on schools that had no existence whatever. Certificates have been presented from countries which have no dental legislation, and in which there is no semblance of a dental educational institution. They usually emanate from some private practitioner whose office is made to assume a sounding title. In other cases they pretend to be granted by some teaching hospital which has no official status.

Your committee has discovered that it is usual for the possessors of such doubtful credentials to write to a considerable number of schools to learn which, if any, will accept their certificates, and to find out whether some institution will not offer a special inducement. Each dean is assured that others will receive the applicant

if he does not. The result is that all of those to whom application has been made are duly informed of the qualifications of suspected students and the probable terms on which they were accepted if the name is found on the lists of any school.

By this it is readily perceived how deans of colleges have been deceived in the past, and how the character of our American schools has been made to suffer for things over which they had no control. The Foreign Relations Committee is prepared to recommend a rating for any foreign school that will submit its curriculum of study and its preliminary requirements of education. This must be approved by the association before becoming effective, and if our schools will govern themselves accordingly the old reproach that we give advanced standing on insufficient qualifications will be forever removed.

A very few schools have manifested some opposition to these regulations. Your committee has, even by some inconsiderate teachers, been accused of an attempt to dominate the colleges. We cannot conceive upon what grounds such a charge should be brought. The committee has done nothing save that which it was positively instructed to do. It has made no rules whatever. It has confined itself to recommending such legislation as it believed absolutely essential to the proper conduct of an educational institution, and if such recommendations have been given legislative enactment, it has tried to carry them into effect, but not otherwise. It has never exceeded its authority nor been unnecessarily aggressive in any of its proceedings. If there exists any reason for criticism of its action on other grounds than opposition to wholesome restraint and the desire to do that which of right ought not to be done, it will be very glad to have such instances pointed out, for its sole ambition has been to carry out the honest wishes of the parent body to which it is responsible.

FRAUDULENT DENTAL DEGREES.

Last year, at the request of the committee, it was relieved of the task of endeavoring to suppress illegal and fraudulent degree-granting institutions, but, as it was already identified with the work, we found that we could not detach ourselves from it entirely. Letters and complaints were persistently directed to us instead of to the Law Committee, to which the subject had been referred. Besides, the diplomas which were sold by the fraudulent schools, and the principal attendance upon those which had a legal existence, but which are unrecognized and unaccepted here, was chiefly in and from foreign countries. Hence its consideration properly belonged to the Foreign Relations Committee, and we could not well refuse to receive the complaints and do what we could in the premises. In our last report we made public the fact that a number of the fraudulent institutions were suppressed and their conductors imprisoned. We hoped that this would practically close up all of them, but special circumstances have intervened to protect certain ones, and the work is not yet completed.

It is not generally known in this country that thousands of

fraudulent diplomas have been sold abroad. Were it possible for foreigners to distinguish between the reputable and the disreputable schools this would not so much matter, but the statutes of the state of Illinois, under which it is possible to incorporate degree-granting institutions which have practically no state supervision or responsibility whatever, and which with legal sanction are, under the great seal of the state, certified as lawfully organized colleges by the Secretary of State of Illinois, simply encourage the fraud. By that certification of the secretary of state the most unblushing impostures are placed apparently upon the same plane with reputable institutions, and foreigners are deprived of all means by which they can positively determine which is worthy recognition and which is not. As a consequence, some foreign governments have used this condition, either honestly or as a desirable pretext, to discriminate against all Americans, and have refused them permits to practice, and positively prohibited under heavy penalties the employment by any one of the American degree or title. This interdiction is spreading very fast, and, unless something is done to forestall it, soon the possession of an American diploma, whether legitimately or illegitimately obtained, will be a positive detriment to a practitioner. In fact, that is the case to-day in some parts of Germany. The influence of such enactments upon American educational affairs and upon the members of this association may perhaps be imagined. Already prohibition is practically accomplished in Southern Germany, is impending in Northern Germany, has been commenced in France, in Italy, and other countries, and there is sharply threatened a combination of all Europe against the American dental degree and the American dental school.

Much of this may, with a considerable degree of justice, be charged against the state of Illinois. Its own legislation has fostered the fraudulent schools that have brought this disgrace upon us. Its dental profession is not without responsibility. When has any body of its dentists put forth any special efforts to bring about a reform? The state has one of the best state dental societies in existence, with a large surplus in its treasury. For many years it has been a leader in thought, because within its membership has been found a great number of the very ablest men in dentistry, men who have done as much to advance dental practice as have any others. The papers read before that society have challenged the attention of the world. Many of the members must have known something of the opprobrious professional legislation upon the statute-books. Not a voice has been raised in denunciation of the condition, not a word has been uttered, until at the last annual meeting a mild resolution deprecativ of the infamous traffic was offered by one unconnected with either schools or boards.

The State Dental Examining Board of Illinois has practically recognized fraudulent and irregular colleges, schools either without any regular course of instruction or with but a very insufficient one, by admitting their students to the state examination and licensing them to practice, and by practically certifying to the regularity of institutions which every dentist in America knows, or should

know, are conducted solely for whatever of revenue there may be in it. The law admits to the state examination for practice anyone who asks for it, and the State Board of Dental Examiners has given the known fraudulent institutions a quasi status by admitting those holding their purchased diplomas to the examination, passing them and giving them the certificate which makes of them regular and legal practitioners. This has been done under the law, but it is Illinois law, and the profession of the state is doing nothing to bring about a reform that professional decency imperatively demands. It is time that the many high-toned professional men of the state were aroused to the stern accountability to which they are liable to be called.

In directing attention to this, your committee must, in justice to the profession of the state, urge that in the opinion of some it has not been wise to admit that which has a real existence, in the hope that the State Board of Health and the medical profession might without scandal succeed in bettering the condition. Surely it must be now apparent to every one that the great work demands the most earnest efforts of every honest dentist of the state. The excellent schools of Chicago have not hesitated to step into the breach when educational interests and professional progress were threatened by the action of other state examining boards. Why should they not attempt a reform in the state law under which their own board acts?*

Last year your committee was able to report that the worst of the fraudulent schools of Chicago had been closed and that their conductors were in prison. That which was done was to a large degree the work of the State Board of Health of Illinois, which brought suit under the United States laws that forbid the use of United States mails for fraudulent purposes. In no other way could the general government at Washington interfere, because in all educational matters each state is autonomous, that being one of the reserved interests not delegated to the general government. The Board of Health being a state institution, it could commence proceedings in the name of the state, and use state funds for the prosecution of the criminals. It has been appealed to by your committee to take up the fraudulent issue of dental degrees, but

*Subsequent to the reading of this report at a meeting of the National Association of Dental Faculties, about three thousand dollars was raised within an hour for prosecution of the work of reform. The National Dental Association afterward appropriated one thousand dollars more. Before the close of the Milwaukee meetings, however, the Illinois dentists in attendance actively commenced the work on their own account, and within a week secured the appointment of a new State Dental Examining Board, while a part of the old board were placed under arrest for malfeasance in office, and for general fraudulent practices. Proceedings were also very promptly commenced to annul the charters of certain irregular or fraudulent schools, and the prospect is very encouraging for the entire removal of the reproach that has so long rested upon them, thus verifying the confident predictions of the committee, that when the profession of the state were fully awakened to the real condition it would without delay be purified as by fire.—B.

the following letter will show that it purposes to confine its labors to the suppression of the sale of medical diplomas:

STATE BOARD OF HEALTH, STATE OF ILLINOIS, SPRINGFIELD.

OFFICE OF THE SECRETARY, July 13, 1901.

Dear Sir,—Your letter of the 3d was received during my absence in the North. In regard to the sale of dental diplomas in Illinois, I cannot give you the letter you desire, for this board is taking no steps whatever to break up the traffic in these degrees. Through the efforts of this board the sale and barter of medical degrees has been entirely suppressed, and the persons who formerly made a business of selling degrees in medicine are now in jail.

With the assistance of the governor of the state and a few medical men we succeeded in getting legislation passed in 1899 by means of which it is a very easy matter to summarily close up any institutions selling degrees in medicine, dentistry, or pharmacy. Under this law the notorious "Metropolitan Medical College" has been closed.

There seems to be no reason why the State Board of Dentistry cannot take action in the matter of sale of dental degrees. If the board chooses it can suppress within two weeks the institutions the "diplomas" of which are sold in Munich or elsewhere. Why this board has taken no action on these lines I am unable to say. The State Board of Health sees no reason why it should assume duties which devolve upon another board. If any medical degrees are sold in this state, I am not aware of the fact. If proof of such sale be presented to this board, the institution or institutions in question can be closed within a month.

Very truly yours,

J. A. EGAN, *Secretary.*

It may thus be seen that we are thrown upon our own resources in the work of closing the institutions engaged in granting fraudulent or irregular dental degrees, and can look to the medical profession for no assistance. Your committee feels confident it can within a short time close up the last of the fraudulent schools, if a sufficient sum of money can be placed at our disposal, and we are so advised by very competent legal counsel. We are prepared to submit a plan of procedure to this association.

AMERICAN EDUCATIONAL AFFAIRS IN EUROPE.

During the past year professional events in Europe having relation to American educational affairs have crowded upon each other's heels in rapid succession. Partly as the result of the appointment of the Foreign Advisory Committees by the association, and more especially through the action of United States governmental agents abroad, an attempt has been made to stem the tide which is so unjustly setting against us in Europe. The papers relating to such action were promptly sent to your committee. We recognized the fact that the purification of the stream must commence at the fountain-head. Practically no fraudulent degrees are sold in America; the countries of Europe are the sea into which the foul tide empties, and the sweetening of the waters cannot be effected there. It is in this country that the remedy must be applied, and until a healthy public and professional sentiment can be evoked here nothing can be done. The condition has existed for years, and it is constantly growing worse. A pest-hole cannot be cleansed until it is uncovered. A festering wound must be laid open that access can be obtained to its foulest depths. The community must be convinced from whence an infection proceeds

before it will abolish the source. Few dentists are aware of what exists in this country. Any man knows that when the honest intelligence of our profession is fully awakened to any enormity, it will move heaven and earth if necessary to put an end to it.

Your committee seized upon the opportunity of the presentation of the most damning proofs coming from official sources to show to the dentists of America what really existed in their midst. Nine out of ten of them had little conception of the condition. When your committee, in its annual report for the year 1898, presented at Omaha, in part laid bare the grossness of the traffic in dental diplomas, the statement was received with incredulity. When that report had been softened in some of its expressions because a part of the committee feared it was exaggerated, it was even then a matter of amazement, and in no place more so than in the state of Illinois. But when inquiry revealed the fact that the half had scarcely been told, the deepest indignation was expressed. All the best of the general educational institutions of the state combined to bring about reform. In their wrath and righteous exasperation they went before the legislature, and met with defeat, because their statements were disputed and their motives impugned by the men whom they attacked. They had no fully awakened public sentiment back of them. Very few were aware of the enormity of the fraud. Their facts were met by counterbalancing statements on the part of men whose honesty had not before been impeached; a flank movement was successfully maneuvered; they themselves were accused of improper motives, and the legislature refused to act. Then an attack was made through the United States courts, which were not under the influence of public opinion, and they succeeded in breaking up a part of the iniquity and in getting through an amendment to the law under which it is possible to annul the charter of an openly fraudulent college. But new charters were easily obtained by the same men, and the work was recommenced under another name. The snake at best was scotched, and not killed. The time for another awakening seemed ripe, and your committee applied to the Secretary of State of the United States at Washington for permission to publish the official reports made to it by Consul Worman, of Munich, Germany. We believed that such publication, under the high sanction of the United States government, of official documents would challenge the attention of American people and greatly tend to produce a public sentiment powerful enough to sweep the fraudulent colleges from the face of the earth. Will it be believed?—from high places came public criticisms and protests against any open attempt to break up the infamous traffic which had seriously involved the reputation of every American school!

The name of Consul Worman has been mentioned. Your committee believes that his efforts to rehabilitate the American degree in Europe have been, and promise to be, of the greatest benefit to dentistry, and his work should be sustained by every one. Your committee has not been able to give him all the assistance it desired, because it was this year without the credit upon the treasurer of the association that has been accorded it in the past, but it hopes

that the good work may not be hindered by this obstacle in the future. Our national, our professional, our individual reputations are at stake. The good name of every member of this association is in the balance, and our vindication from a foul blot upon our professional escutcheon must not be a matter of indifference. To assume that this is in the interests of antagonistic foreign governments, that it is doing their dirty police work, is to attempt to cover up and apologize for and justify the villainy that is being done in our names, to assume complicity with the men who are trading on our good deeds, and who under cover of the high reputation of American dentistry, won by us, are endeavoring to foist upon foreign communities a counterfeit that must of necessity throw doubt upon the original.

FOREIGN DENTAL SCHOOLS.

In the face of the fact that a most determined effort is being made in some foreign countries to break down the reputation of American dental schools, and to discredit all American professional education, and in the knowledge that not only are our courses refused any consideration, but sometimes made a pretext upon which to forbid Americans to enter upon practice, this association cannot be accused of illiberality or of professional narrowness should it decline to accept foreign qualifications as a sufficient warrant for practice in this country. There should be some kind of reciprocity in professional affairs, and Americans ought not to be expected to extend all the professional courtesies granted. And yet, exact justice might, in the minds of many, demand that, irrespective of what may be done to us, we should be forgiving, and in return for the buffetings that we receive humbly expose the other cheek to the smiting hand. That course is perhaps highly Christian, but it is not quite in accordance with the impulses of an ordinary human nature. The man or the school that has not sufficient self-respect to maintain inalienable rights can scarcely expect to receive the consideration which may be honestly due.

But were this the only reason to be urged against the unquestioned acceptance of all foreign qualifications, we might justly be called churlish and professionally illiberal were we to exclude any one who asked our recognition. America was the first to establish any system of dental education. It embraced a full course of instruction the whole of which must be covered within the walls of a duly chartered institution devoted to dental instruction. It was provided that all work leading to our special degree must be done under the direct supervision of qualified and accepted teachers. Recognizing the prosthetic department as one of the most important in dental practice, we insisted that it must have a scientific basis, and not be a matter of mere empiricism. We established the principle that our students must be under the pupilage of one who was acquainted with mechanical laws, and that the teaching of physical science should not be entrusted to possible charlatans. The instructor in mechanics must be responsible to the authority which granted the diploma or certificate of qualification.

The opposite course was pursued in founding the dental system of education in some other countries. Recognizing that many skillful mechanics were outside the pale of the fully qualified men, they practically excluded prosthetics from the college curriculum, classed mere mechanical skill as handicrafture, and permitted its instruction to be received at the hands of irresponsible men. They established a system of apprenticeship which in a manner bound out the student to a dental mechanic, who should give him instruction in one of the most important departments of dentistry. It could not be expected that we should accept such instruction as the equivalent for our full college courses. This condition was the most embarrassing question that came before your committee in the attempt to establish a system of equivalents. Our schools refuse to give to an American student any advanced standing for time spent in the laboratory or office of a practitioner who has not teaching experience and responsibility. The matriculant may have passed years in a dental office, but he must join the freshman class on entering our colleges. Our diplomas or certificates are only granted upon the completion of a definite scholastic course. Occasionally some one has urged that merit and knowledge and skill should be recognized wherever found, and without reference to their source. But that is the very pretext urged by the fraudulent and short-term schools for the granting of their honors after an incomplete course,—they themselves conducting the examination and being the sole judges of that skill and merit.

Why American colleges or college men should desire to shorten the usual term is past comprehension, for it is prejudicial both to their educational and their financial interests. A degree is granted as a reward for the completion of a full course. It is not a recognition of merit. No two men reap the same advantages from a given amount of instruction. One man graduates a skilled, dextrous practitioner, while another is much his inferior. But both have earned their diploma by having successfully completed a prescribed course of study. Many men in the profession do not comprehend this, and blame the schools because a graduate is not as clever and expert in his technical manipulation as the experienced practitioner. Our schools demand the successful completion of a definite course in mechanics. We cannot recognize the qualifications of any man who has not complied with a reasonable requirement that is demanded of our own graduates. We cannot accept the course of any school that does not require this, and your Foreign Relations Committee has not recommended as the equivalent for ours the certificates of any such schools. The most that we can do for those that accept the apprenticeship system as a part of their course is to give one year's advanced standing for the completion of a full and complete three or four years' pupilage with final graduation.

Under our present legislation it is illegal and irregular for any member of this association to admit to its senior class any student who has not at least the following qualification:

Successful completion of two full terms in a dental school *whose course has been accepted by this association as a full equiva-*

lent for its own, and who shall by that school be recommended for such advanced standing.

Admission to the second or junior class of any of our schools can only be permitted to those who have one of the following qualifications:

(1) Successful completion of one full term in a dental school whose course has been accepted by this association as a full equivalent for its own courses, the student being by that school recommended for such advanced standing.

(2) Successful completion of the full course of some regular and duly accepted medical school, and graduation with the degree of Doctor of Medicine.

No partial courses are accepted, nor those spent in a school not fully and definitely recognized by this association. Surely we cannot grant more than this to those making application from foreign countries while denying it to our own people.

This principle has governed the Foreign Relations Committee in making its recommendations for the recognition of foreign schools. There have been urgent requests for such recognition, but your committee has not felt itself at liberty to recommend what is not granted to our own schools and people. If any foreign school will demonstrate that its curriculum of study is the full equivalent of our own, and that it has complied with the statute of minimum requirements established by this association at its last annual meeting, your committee will be prepared to examine its claims and to recommend such action to this association as the course of study seems to warrant.

Your committee, in conclusion, points with no ordinary pride to what has been accomplished within the past five years as the result of an attempt to regulate our relations with foreign schools and foreign students, and to the high professional ground on which we now stand. There should be no further complaints, on the one hand that we accept unqualified men from abroad, or on the other that foreigners can come here and, without going through the full course demanded of American students, carry off our honors and claim to be American dentists, the colleagues of those who have completed our full curriculum of a broad course of dental study.

The foreign advisory boards, appointed with the approval of this association, have proved to be useful auxiliaries in the carrying out of our system of education. In Europe they have completed an organization, and will henceforth work together in harmony. They must exercise an important and wide influence in educational affairs, and their action cannot but be for good. They will guard the interests of those holding the American degree, and help to prevent it from being unworthily conferred. Your committee has made some further appointments in countries heretofore unrepresented, which it reports for approval. It is very much to be desired that at each of our annual meetings representatives from these foreign advisory boards should be in attendance whenever possible, and we recommend the enactment of a standing resolution giving to such regular representatives a seat in our meetings with the usual privileges of the floor.

REPORT CONCERNING FOREIGN EQUIVALENTS, AS AMENDED FOR
THE YEAR 1901.

Were your committee to follow the precedent set by most foreign countries, no consideration would be given to their qualifications. Although America set an example to all the world in establishing a definite curriculum of instruction for dentists, in organizing schools for their theoretical and practical training, thereby erecting into a recognized profession or specialty that which previously was mainly empiricism and charlatanry, no official recognition of its special curriculum has ever been given by the dentists of foreign countries, although in great numbers they have attended our schools to obtain the advantages offered by that curriculum.

Your committee believes it to be neither fraternal, professional, nor just to adopt the same course, but thinks it both expedient and right to extend proper recognition to whatever can be received as an equivalent for our own courses. It must not be forgotten, however, that the system of dental instruction in Europe varies very widely from that of our special American schools. Instruction separate from that afforded by the medical schools or universities is very rare, and the practical training which forms a part of our curriculum is usually given by private preceptors. Your committee does not feel at liberty to recommend the acceptance of an oral and theoretical course as the equivalent for one including practical work. We cannot believe that the certificates of private and irresponsible practitioners can by us be accepted as any part of a college course, and hence we have given them little consideration.

Australia.

A very complete report from the various colonies of Australia and New Zealand has been made by the advisory board appointed for those countries. It would appear that in most of the colonies there is no dental legislation, but Victoria has lately secured a law analogous to that of England, and in Melbourne a dental school has been organized whose curriculum, from the partial syllabus furnished, seems to be a comparatively broad one. The institution has been but recently established, and your committee has been unable as yet positively to determine whether in all respects it complies with our minimum requirements. When this shall have been definitely determined, we shall be prepared to recommend to this body some proper action.

In the provinces of Western Australia and Tasmania no dental legislation has been secured.

There is a dental law in New Zealand, and the member of the advisory board from that province has furnished your committee with an abstract of it. There are no dental schools in the province.

Switzerland.

This is a republic analogous to our own country in some respects, the federal union being composed of separate cantons. There are some excellent universities which offer certain facilities for dental study, but their practical instruction, we believe, cannot be accepted

as an equivalent for that offered by American dental colleges. Your committee recommends that holders of the Swiss national diploma be given one year's advanced standing in the schools of this association, but that no consideration be at present extended to holders of the cantonal qualifications.

Spain.

The Spanish requirements in medicine are very high, but your committee has not learned that there are any dental schools, or dental departments of universities, whose course of instruction can be accepted as the full equivalent for the instruction given in American dental colleges.

France.

In accordance with the recommendations of the advisory board for this country, your committee recommends as follows:

That one year's advanced standing be given to students possessing the French government diploma of "Chirurgien Dentiste" who have completed the three years' course in either the "École Dentaire de Paris" or the "École Odontotechnique," and that the same consideration be given the French diploma of Doctor of Medicine.

That in all cases the American preliminary examinations as to educational requirements be demanded, and that a sufficient acquaintance with the English language to enable the student to comprehend lectures be an essential.

Germany and Austria.

Your committee recommends that students speaking the English language, who have taken the full dental course in German or Austrian universities, be eligible for reception in the second-year classes of American dental colleges, provided it be shown that they have had at least two semesters of competent college instruction in practical laboratory and operative work.

Italy.

There are, we believe, no schools in Italy which have courses that can be accepted as equivalent to those of our American dental schools. The instruction given in the medical schools your committee believes to be too exclusively general in its character to form an acceptable course in dentistry for American students.

Holland and Belgium.

In these countries the title of dentist is obtained by passing a practical examination in the theory and practice of dentistry. There are no separate dental schools, and we are not sufficiently informed of the comprehensiveness of the syllabi of the universities to offer any recommendations concerning them.

Great Britain.

Your committee recommends that all students who shall have finished the complete course in any recognized English, Irish, or Scotch dental school or hospital, shall be eligible for reception as

second-year students in American dental colleges upon proof of their having taken as a part of such foreign course two years of instruction in a properly equipped dental laboratory and dental infirmary connected or affiliated with such dental school or hospital, and which requires the successful completion of the work deemed essential by recognized American schools, as formulated in the minimum requirements for foreign dental schools accompanying this report. We further recommend that for the present no consideration be given to partial courses in any of the dental schools of Great Britain.

Denmark, Sweden, and Norway.

Sweden has one dental school, which is the dental department of the Caroline Medico-Chirurgical Institute of Stockholm. Instruction is given by five professors of the medical department, and there are three dental professors, occupying respectively the chairs of dental surgery, operative dentistry, and dental prosthetics and orthodontia. From the assurances given, your committee believes that its graduates should be permitted to enter the second-year class of recognized American dental colleges, provided they shall have complied with our requirements concerning mechanical laboratory work.

Your committee has not sufficient knowledge concerning any school in Denmark or Norway to warrant further recommendations at present.

Japan.

There is one dental school in Japan. It confers no degree, but gives a certificate which entitles the holder to government examination, the same as if he had studied with some practicing dentist. As the instruction is personal and the school is quite irresponsible, your committee believes that no consideration can be given to those completing its courses.

Mexico.

There is a medical school in the City of Mexico which purports to give dental instruction. Your committee cannot learn that it is of such a character as will enable it to be accepted as the equivalent for a course in an American dental college.

Canada.

There is but one school in the Dominion, so far as your committee is aware, whose courses can be accepted as an equivalent for those of our own colleges, and that is at present a member of this body, so that it requires no special ruling.

Other Foreign Countries.

Concerning the educational status of other nations, your committee is not in possession of sufficiently definite information to warrant any action whatever. We have no knowledge of the existence of any courses of instruction which can be accepted as an equivalent for the courses in the institutions having membership in this body, and therefore advanced standing in our schools cannot

in justice to our own students be granted save in the instances above enumerated.

REPORT CONCERNING MINIMUM REQUIREMENTS.

That a proper standard may be adopted by which the relative value of the courses in foreign dental schools whose students offer them as equivalents for a part of the instruction given in the colleges of this association may be determined, your committee recommends the approval of the following as the minimum of requirements demanded:

1. The college must require of matriculants a preliminary education which is the full equivalent of that demanded by the schools of this association.

2. The college must demand of students full attendance upon at least three full annual courses (not semesters) of lectures of not less than seven calendar months each in separate years, covering all the studies proper to a full dental curriculum.

3. The college must possess a bacteriological laboratory, with sufficient equipment for instruction in a competent course in bacteriology, which must form a part of its curriculum of study.

4. The same must be required in chemistry, histology, and pathology.

5. There must be a technic laboratory in which shall be taught the proper manipulation for the insertion of all kinds of fillings for teeth, the preparation and filling of the roots of teeth, the tempering and shaping of instruments, the drawing of wire and tubing for cases in orthodontia, and the cutting of bolts and nuts.

6. There must be prosthetic laboratories sufficiently equipped for teaching all kinds of prosthetic work, and the construction of all the approved prosthetic appliances.

7. There must be a sufficiently equipped laboratory for instruction in making crowns and bridges, and the construction of appliances used in orthodontia.

8. There must be a properly equipped infirmary or surgery for the reception of patients, upon whom each and every student shall be required individually to perform all and enough of the operations necessary in dental practice thoroughly to qualify him for the successful pursuance of his profession.

9. Complete records of the work done by each student, of his attainments at sufficient and full examination in each subject of the curriculum of study, of his attendance and deportment during the course, must be permanently kept.

10. No credit must be allowed for any work not done under the immediate supervision of instructors connected with or especially approved by the college, and who are in direct affiliation with the faculty.

FOREIGN ADVISORY BOARDS.

The following is a list of the countries for which advisory boards have been designated, and the appointments and nominations so far as made:

COUNTRY.	NAME.	COLLEGE.	POST OFFICE ADDRESS
Great Britain.	Wm. Mitchell, D.D.S.	Univ. of Michigan.	39 Upper Brook St., London, England.
" "	W. E. Royce, D.D.S.	Phila. Dental Coll.	2 Lonsdale Gardens, Tunbridge Wells, England.
" "	B. J. Bonnell.		94 Cornwall Gardens, So. Kensington, London.
Holland and Belgium.	J. E. Grevers, D.D.S.		13 Oude Turfmarkt, Amsterdam, Holland.
" "	Ed. Rosenthal, D.D.S.	Harvard Univ.	19 Boul. du Regent, Brussels, Belgium.
" "	C. Vander Hoeven, D.D.S.		Der Haag.
Denmark, Swe. & Nor'y.	Elof Forberg, D.D.S.	Phila. Dental Coll.	Sturegatan 24, Stockholm Sweden.
" " "	S. S. Andersen, D.D.S.	Univ. Pennsylvania.	Christiania, Norway.
" " "	L. P. Vorslund-Kjaer, D.D.S.	Phila. Dental Coll.	Copenhagen, Denmark.
Russia.	H. V. Wollison, D.D.S.	N. Y. Coll. Dent.	10 Quai de l'Amaranti, St. Petersburg, Russia.
"	Theo. Weber, D.D.S.	N. Y. Coll. Dent.	Helsingfors, Finland.
"	Geo. Th. Berger, D.D.S.	Phila. Dental Coll.	St. Petersburg, Russia.
Germany.	W. D. Miller, D.D.S.	Univ. Pennsylvania.	Victoriastrasse 30, Berlin, Germany.
"	C. F. W. Bodecker, D.D.S.	N. Y. Coll. Dent.	55 Unter den Linden, Berlin, Germany.
"	Freidrich Hesse, D.D.S.	N. Y. Coll. Dent.	Goethe Str. 6, Leipzig, Germany.
Austria and Hungary.	Otto Szigmondi, M.D., Ch.D.	Univ. Vienna.	Schmerlingplatz 2, Vienna I, Austria.
" "	Rudolf Weiser, M.D., Ch.D.	Univ. Vienna.	Frankgasse 2, Vienna IX, Austria.
" "	Dr. Jos. Arkövy.	Univ. Buda-Pesth.	Vaczi-utca, Budapest, Hungary.
Italy and Greece.	Albert T. Webb, D.D.S.	Univ. Pennsylvania.	87 Via Nazionale, Rome, Italy.
" "	Tullio, Avanzi.	Nominated.	
" "	A. V. Elliott, D.D.S.	Univ. of Mich.	10 Via Tornabuoni, Florence, Italy.
France.	J. H. Spaulding, D.D.S.	Univ. of Minnesota.	39 Boul. Malesherbes, Paris, France.
"	George B. Hayes, D.D.S.	Univ. of Mich.	Paris, France.
"	G. A. Roussel, D.D.S.	N. Y. Coll. Dent.	74 B'd Haussmann, Paris, France.
Spain and Portugal.	R. H. Portuondo, D.D.S.	Univ. Pennsylvania.	Paseo de Recoletos 3, Madrid, Spain.
" "	Florestan Aguilar, D.D.S.	Phila. Dental Coll.	Serrano 5, Madrid, Spain.
" "	T. J. Thomas, D.D.S.		Bilboa, Spain.
Switzerland and Turkey.	L. C. Bryan, D.D.S.	Boston Dent. Coll.	St. Alban Anlage, Basel, Switzerland.
" "	Theo. Frick, D.D.S.	Univ. Pennsylvania.	14 Tonhallenstrasse, Zurich, Switzerland.
" "	Paul J. Guye, D.D.S.	Penn. Dent. Coll.	12 Rue de Candolle, Geneva, Switzerland.
Japan, China and India.	J. Ward Hall, D.D.S.		Shanghai, China.
Australia & New Zealand	Alfred Burne, D.D.S.	Phila. Dental Coll.	1 Lyon Terrace, Liverpool Street, Sydney.
" " "	Dr. A. P. Merrill.	Phila. Dental Coll.	52 Collins St., Melbourne.
" " "	Herbert Cox, D.D.S.	Univ. of Michigan.	216 Queen St., Auckland, New Zealand.
Cuba & W. India Islands.	Rice R. Buchanan, D.D.S.		47 San Francisco St., San Juan, Porto Rico.
" " "	A. E. Mascort.	Nominated.	Havana, Cuba.
Mexico & Cent. America.	H. W. F. Buttner.	Nominated.	City of Mexico.
" " "	J. W. Purnell.	Nominated.	Merida, Yucatan.
" " "	J. Hunter.	Nominated.	Puerto Cortez, Honduras.
Venez., Colom. & Equa'r.	Manuel V. Toledo.	Nominated.	Caracas, Venezuela.
" " "	J. R. Martinez.	Nominated.	Guayaquil, Ecuador.
Peru, Bolivia & Chile.	Charles B. Davies, D.D.S.	Penn. Dent. Coll.	49 Plaza Anibal Pinto, Valparaiso, Chile.
" " "	S. R. Salazar, D.D.S.	Chicago Coll. Dent. Sur.	Lima, Peru.
" " "	C. W. Sparrock, D.D.S.	Nominated.	Lima, Peru.
Brazil and Guiana.	J. L. Fordham.	Nominated.	Rio de Janeiro, Brazil.
" " "	Julius Weinburger.	Nominated.	Para, Brazil.
Argentina, Para. & Uru.	J. S. Burnett.	Nominated.	Salto, Uruguay.
" " "	J. C. Macartney.	Nominated.	Montevideo, Uruguay.

MEMBERSHIP OF THE NATIONAL ASSOCIATION OF DENTAL FACULTIES, AT ADJOURNMENT, JULY, 1901.

The following is a list of the dental colleges of America which at the present time are members of the National Association of Dental Faculties, whose diplomas and tickets alone are recognized and received by the members of the association:

Alabama.....	Birmingham.....	Birmingham Dental College.
California.....	San Francisco.....	Dental Dept. of College of Physicians and Surgeons.
".....	San Francisco.....	University of California, College of Dentistry.
".....	Los Angeles.....	College of Dentistry, Univ. of Southern California.
Colorado.....	Denver.....	Colorado College of Dental Surgery.
District of Columbia.....	Washington.....	Dental Department of National University.
".....	Washington.....	Dental Department Columbian University.
".....	Washington.....	Dental Department of Howard University.
".....	Washington.....	Georgetown University, Dental Department.
Georgia.....	Atlanta.....	Atlanta Dental College.
".....	Atlanta.....	Southern Dental College.
Illinois.....	Chicago.....	Chicago College of Dental Surgery.
".....	Chicago.....	College of Dentistry, University of Illinois.
".....	Chicago.....	Northwestern University Dental School.
Indiana.....	Indianapolis.....	Central College of Dentistry.
".....	Indianapolis.....	Indiana Dental College.
Iowa.....	Iowa City.....	University of Iowa, College of Dentistry.
".....	Keokuk.....	Keokuk Dent. Col., Dent. Dept. of Keokuk Med. Col.
Kentucky.....	Louisville.....	Louisville Col. of Dentistry, Dept. of Cent. U. of Ky.
Louisiana.....	New Orleans.....	New Orleans College of Dentistry.
Maryland.....	Baltimore.....	Baltimore College of Dental Surgery.
".....	Baltimore.....	Baltimore Medical College, Dental Department.
".....	Baltimore.....	Dental Department University of Maryland.
Massachusetts.....	Boston.....	Dental School of Harvard University.
".....	Boston.....	Tufts College Dental School.
Michigan.....	Ann Arbor.....	Dental College University Michigan.
".....	Detroit.....	Dental Department Detroit Medical College.
Minnesota.....	Minneapolis.....	College of Dentistry, Dept. of Med., Univ. of Minn.
Missouri.....	Kansas City.....	Kansas City Dental College.
".....	Kansas City.....	Western Dental College.
".....	St. Louis.....	Marion-Sims Dental College.
".....	St. Louis.....	Missouri Dent. College, Dent. Dept. of Wash. Univ.
Nebraska.....	Omaha.....	Dental Department University of Omaha.
New York.....	New York.....	New York College of Dentistry.
".....	New York.....	New York Dental School.
".....	Buffalo.....	University of Buffalo, Dental Department.
Ohio.....	Cincinnati.....	Cincinnati College of Dental Surgery.
".....	Cincinnati.....	Ohio College Dental Surgery.
".....	Columbus.....	Ohio Medical University, Dental Department.
".....	Cleveland.....	Western Reserve University, Dental Department.
Oregon.....	Portland.....	North Pacific Dental College.
Pennsylvania.....	Philadelphia.....	Dental Department University of Pennsylvania.
".....	Philadelphia.....	Medico-Chir. College of Phila., Dept. of Dentistry.
".....	Philadelphia.....	Pennsylvania College of Dental Surgery.
".....	Philadelphia.....	Philadelphia Dental College.
".....	Pittsburg.....	Pittsb. Dent. College, Dept. of West. Univ. of Pa.
Tennessee.....	Nashville.....	Dental Department, University of Tennessee.
".....	Nashville.....	Department of Dentistry of Vanderbilt University.
".....	Nashville.....	Sch. of Dent. of Meharry Med. Col., Dept. of C. T. Col.
Virginia.....	Richmond.....	University College of Med. and Surgery, Dent. Dept.
Wisconsin.....	Milwaukee.....	Milwaukee Medical College, Dental Department.
Canada.....	Toronto.....	Royal College of Dental Surgeons of Ontario.

WILLIAM C. BARRETT,
208 Franklin st., Buffalo, N. Y.

JOHN D. PATTERSON,
Ninth and Walnut sts., Kansas City, Mo.

TRUMAN W. BROPHY,
126 State st., Chicago, Ill.

M. W. FOSTER,
9 W. Fayette st., Baltimore, Md.

EUGENE H. SMITH,
283 Dartmouth st., Boston, Mass.

Foreign Relations Committee.

MASSACHUSETTS STATE DENTAL SOCIETY.

The thirty-seventh annual meeting of the Massachusetts Dental Society was held at the Massachusetts Institute of Technology, Boston, June 5 and 6, 1901; the president, Dr. John F. Dowsley, in the chair.

The regular meeting of the society was opened by the president at 2.15 P.M. Routine business having been transacted, the president read the annual address.

Dr. DOWSLEY said in part: "In addressing you at this the thirty-seventh annual meeting I must first congratulate you upon the excellent condition of our society, and upon the earnest and effective endeavors made during the past year by the members individually and as an organization, according to the objects for which it was founded, to cultivate the science and art of dentistry in all its collateral branches, to elevate and sustain the professional character of dentists, and to promote among them mutual improvement, social intercourse, and good will. An organization of this sort is of the greatest value to our profession. It provides means for united action for the common welfare. It arranges for the discussion of topics of moment, for an exchange of views, and for individual recommendations. Moreover, it encourages a dependence upon the professional opinion of others which does not injure personal initiative and is likely to prevent errors.

"At the second annual meeting of this society, in 1865, it was resolved 'That it is the duty as well as the interest of the people to require of all who hereafter enter on the practice of dentistry that they shall have received in course a diploma of graduation from the dental college as the first requisite for public confidence and patronage.' A diploma of graduation is an educational surety. No man could take a course at college and graduate without having gained some knowledge and skill, however inferior the institution or however negligent he may be. Of course there may be fraudulent diplomas, but these are easy to discover. Colleges differ, however, in standards of requirements, which the state has no authority to regulate though it grant their charters. They may fit their students for the practice of dentistry; but the public and professional welfare demands that in this no risk shall be taken. The state must ascertain whether the graduates from the various dental colleges are qualified to be practitioners. In order to do so there is but one resort,—examination of all who desire to practice dentistry by a state board, such as we have in Massachusetts. I wish to say that I see no reason for clashing between state boards and our colleges. Their aims are similar, though they differ widely in reaching the end sought. I do not wish for a moment to detract in any way from the great work done by our colleges, but I do think that the state board examinations have stimulated the efforts for higher standards all along the line. The amicable relations existing between the state board and our colleges in this city are important, for their benefit to the profession, which is a matter for congratulation. I am optimistic enough to believe that we shall soon see a large number of our dental col-

leges in all parts of the country requiring of those who enter a liberal education, higher than that now possessed by the average graduates of our high schools, and that this result will be obtained by insisting on educational development definitely relative to the work which the student of dentistry, and the dentist, is called upon to perform. Indeed, in the last decade the majority even of fairly good schools had only the time-honored but utterly useless check on unfit applicants, that they should be of 'good moral character.' Of late rapid progress has been made, though it is indeed true that if we look at the entrance requirements of many of our dental schools we will still find much to be desired.

"The dental laws have, it seems to me, generally improved the average dental work throughout the country, as no state or territory, save Indian Territory, is without dental legislation, which necessitates higher skill generally. When the act regulating the practice of dentistry in this state was passed in 1887, and for many subsequent years, instead of united support the state board met with opposition and indifference from the profession. I am happy to say that this opposition and indifference are rapidly disappearing. I believe the vast majority of practitioners are now in entire sympathy with what is being accomplished.

"It is the duty of this society to see that the dental law is enforced, as the chief value of a law lies in its thorough enforcement.

"Lately a new kind of violation has appeared, that of physicians who seek to take advantage of Sec. 9, Chap. 137 of the Acts of 1887 of the public statutes: 'Nothing in this act shall apply to any practicing physician who is a graduate from the medical department of any incorporated college.' The exemption, however, is for the benefit of a practicing physician, so that a graduate of an incorporated college not practicing *bona fide* as a physician cannot be entitled to this privilege. If such a man should set up an office with dental chair, etc., as his principal business, he clearly must come under the law just as any other person who claims the right to practice dentistry, and the fact that he happens to be a graduate of the medical department of some incorporated college is no defense. That is to say, the right to practice dentistry under this exemption must be simply incidental to his practice as a physician, and not be the chief or a considerable part of his profession or living. The evident purpose of the law in this regard is not that a medical diploma is an equivalent for the examination and certificate of registration required for the regular practice of dentistry, which would be absurd, but merely that no regular physician may be deterred from performing a dental operation or treatment of a patient whenever a case arises in his medical practice requiring immediate attention or relief. This service may no doubt be charged for, but that such a physician should have the right to enter upon the regular practice of dentistry without a certificate of registration from the board is clearly not the intention of the law. The object of this exemption, as of the law itself, is primarily the relief to the individual patient and the good of the public. Whether a physician comes within this exemption or leaves himself amenable

to the penalty in any given instance must be a question of fact for the court to decide, but the law is clear in this respect.

"A point which I wish to emphasize is the need for interstate and international interchange of licenses. It is without doubt a great hardship for a dentist qualified to practice in one state or country to be subjected in another to an examination upon his knowledge of the science and his skill in the art. But at present there is no alternative for the public and professional welfare. Until the examinations of the boards in the several states be uniformly meritorious and a common standard of requirement be established there is no other means to be employed. Progress is being made toward the necessary end for the adjustment of interstate and international relations in dentistry. It is hoped that the deliberations upon the matter at the recent Paris Congress will do much toward forming a basis upon which the relations of the United States with foreign countries concerning this subject will be so arranged that a common standard of educational requirement will be agreed upon, resulting in the interchange of licenses. Excellent progress has been made in the matter of interchange of licenses in New England. Another need of dentistry is mutual protection against blackmail. I would suggest that a by-law be enacted providing that a committee be appointed to investigate, independently of the state, any charge brought against a member of this society in good standing. If it finds that he is not guilty this society should give him its moral support, but if it finds him guilty of a crime against morality he should be expelled from the society. For the good of the profession we cannot afford to harbor or associate with such men.

"Perhaps there is no problem for those who are interested in the professional welfare more serious than that of the suppression of the charlatan. The low-class quack, when he is not debarred from practice by a state board, is easily discovered and his methods exposed. The high-class quack, however, is not subjected to such danger. He enjoys at present as much security as the conscientious practitioner. The state board cannot disqualify him, for he is a clever man, able to pass a severe examination creditably and even brilliantly. The law defines who may practice and who may not, but the law cannot designate the methods that dentists may employ to attract patronage, as long as they do not make themselves liable under the criminal code. The law may insist upon ability, but it cannot evolve conscientiousness. Ability the high-class quack manifests satisfactorily; conscientiousness he disregards. Whatever be the standard of excellence he attains it, whatever be the easiest way of prospering he employs it; in which scheme,—involving work that must be inferior for low prices, appealing to the false economy of his patrons,—is advertising. This is one of the shrewdest methods of the quack's plan for enriching himself at the expense of the ignorant. He may claim and declare and depict in many of the most widely circulating papers, and besides attracting the attention of a large number of people he avoids exposure, for the papers, for the most part willing to accept any kind of advertising, endeavor to keep it by refusing to print

the denunciations of reputable practitioners; their purpose, as well as that of the quack, is to make money. The sentiment was expressed at the International Dental Congress in Paris last August that the best means of combating charlatanism consists in the education of the general public in dentistry and dental hygiene by the societies, the dental journals, and the schools. The meritorious newspapers also provide opportunity for this, and by their aid a stigma, entailing loss of patronage, may be placed upon those who encourage the quack.

"It will be admitted by all of us that one of the things we most desire is the highest possible success in our profession. To obtain this certain conditions must be complied with, among which the one now to be considered is, that in all our habits of life we must be temperate. In the degree that a man indulges in excesses, in that degree he detracts from his possibilities of success. No man can realize his fullest capabilities or attain to his completest development unless he keep his physical powers intact. Therefore, if we have no higher incentive to virtue than the consideration of professional success, that alone ought to be sufficient to divert us from excessive habits. We also owe certain duties to our profession, and among these the most important is that we strictly maintain our professional code of ethics. In all our relations to those who seek our services, we should be courteous, obliging, honest; our personal deportment, and the appointments of our offices, should be such as to indicate that we are gentlemen. Our social relations should be such that we may sustain a high moral character. And unless we meet these conditions we are unworthy the confidence of the public and the recognition of the profession. Nor should we resort to questionable means of securing patronage. If at any time we fail of satisfactory success, we may be assured that the obstacles to our progress lie within ourselves, for when we have made our services valuable there will be a demand for them. Let us not look to our profession to confer honor or social distinction upon us, for we must remember that the profession cannot honor the man unless the man first honors the profession. But by integrity and morality, by our culture and our skill, we may bring credit to the profession and to ourselves.

"Again, so rapid has been the progress of dentistry that the public are not always conversant with its most advanced ideas; therefore it comes within our province to so instruct our patients that they will receive these ideas and appreciate our work. This is the only channel through which they are to become informed in this direction, and by so doing a threefold advantage is derived: we are individually benefited, the interests of the profession are promoted, and the public is better served. The reputation of the profession is in our keeping, and we as members of it are in duty bound to maintain its honor and to labor earnestly to extend its sphere of usefulness.

"Among other considerations we must not overlook our relations to our state society. It is our filial duty to give her our support, to honor her with our best efforts, and to sacredly guard her reputa-

tion. Our relations are inseparable,—her interests are our interests, our future is her future, and if our reputation suffer a shadow will be cast upon her fair name. Therefore, I would say, let us attain to such a degree of proficiency in our work, of integrity and honesty in our lives, that we may honor ourselves, our profession, and our state society."

(To be continued.)

PENNSYLVANIA STATE DENTAL SOCIETY.

At the annual meeting of the Pennsylvania State Dental Society held at Ligonier, July 10-12, 1901, the following officers were elected: M. H. Cryer, president; R. H. Nones, vice-president; J. E. Libbey, second vice-president; C. V. Kratzer, recording secretary; V. S. Jones, corresponding secretary; R. H. D. Swing, treasurer. Executive committee—R. H. Nones, Grant Mitchell, and H. M. Beck.

V. S. JONES, *Cor. Sec'y.*

NORTHERN IOWA DENTAL SOCIETY.

At the annual meeting of the Northern Iowa Dental Society held at Arnold's Park, on Lake Okoboji, September 3, 4, and 5, 1901, the following officers were elected for the ensuing year: J. A. Walter, McGregor, president; William Finn, Cedar Rapids, vice-president; W. G. Crandall, Spencer, secretary; H. W. Rizer, Lansing, treasurer.

The next annual meeting will be held at Cedar Rapids, September 2, 3, and 4, 1902.

W. G. CRANDALL, *Sec'y.*

DENTAL SOCIETY OF WESTERN CANADA.

THE second annual meeting of the Dental Society of Western Canada was held in Friendship Hall, McIntyre block, Winnipeg, on July 29 and 30, 1901. Papers and clinics were as follows: Papers—"Adaptation of Artificial Dentures," by C. P. Banning; "The Care of Children's Teeth," by A. L. McLachlan; "Abscess of the Antrum of Highmore," by B. J. Curry; "Cavity Preparation," by C. N. Johnson; "Instructing Our Patients," by W. D. Cowan; "The Undesirable Side of Some of the Preparations used in Dentistry," by G. F. Bush. Question Drawer—C. N. Johnson and G. J. Clint. Clinics—"Removal of Pulp; Immediate Root-filling; Use of Retaining Screws and Lingual Surface Matrices," by G. J. Clint; "Practical Suggestions in Crown-Work," by J. E. Ross; "Use of Moss Fiber Gold," by N. Schnarr; "Gold Filling," by C. N. Johnson.

Dr. C. N. Johnson, of Chicago, by his practical talks, demonstrations, and interest in the proceedings specially contributed toward the success of the meeting. Before adjournment Dr. Johnson was elected an honorary member and a hearty vote of thanks was extended to him for his presence.

The election of officers and committees for the year resulted as follows: S. W. McInnis, M.P.P., Brandon, Man., president; N. Schnarr, Rat Portage, Ont., W. D. Cowan, Regina, N.W.T., and G. J. Clint, Winnipeg, Man., vice-presidents; G. C. Mathison, Winnipeg, Man., secretary-treasurer.

G. C. MATHISON, *Sec'y.*

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

At the last meeting of the National Association of Dental Examiners, held at Milwaukee on August 2-6, 1901, the following officers and committees were elected and appointed: John F. Dowsley, 175 Tremont street, Boston, Mass., president; Charles A. Meeker, 29 Fulton street, Newark, N. J., vice-president; J. A. Hall, Collinsville, Ala., second vice-president; B. L. Thorpe, La Clede and Vandewenter avenues, St. Louis, Mo., third vice-president; J. Allen Osmun, 588 Broad street, Newark, N. J., secretary and treasurer. Committee on colleges—C. C. Chittenden, Madison, Wis., chairman; J. A. Hall, Collinsville, Ala.; H. J. Burkhardt, Batavia, N. Y. Committee on conference—M. F. Finley, Washington, D. C., chairman; E. E. Kirkpatrick, Oklahoma; Charles A. Meeker, Newark, N. J. Membership committee—George Everett Mitchell, Haverhill, Mass; Melville A. Mason, Indianapolis, Ind.; Max N. Ebele, Louisville, Ky. Committee on contracts and arrangements—Charles A. Meeker, Newark, N. J.

J. ALLEN OSMUN, *Sec'y.*

DENTAL SOCIETY ANNOUNCEMENTS.

UNION MEETING OF THE SIXTH, SEVENTH, AND EIGHTH DISTRICT DENTAL SOCIETIES OF THE STATE OF NEW YORK.

THE thirty-third union meeting of the above societies will be held in the assembly room of the Osburn House, Rochester, N. Y., Tuesday, Wednesday, and Thursday, October 29, 30, and 31, 1901. The preliminary program is as follows:

"Will Nitrous Oxid and Oxygen Supplant Ether and Chloroform in General Surgery and Nitrous Oxid Alone in Dental Surgery?" Dr. W. J. Roe, Philadelphia; "The Enamel of the Central Incisors," Dr. Sylvester Moyer, Galt, Ontario; "Some Embarrassing Educational Problems," Dr. W. C. Barrett, Buffalo; "Amalgam; the Place it has Won in Dentistry," Dr. F. A. Balachey, Buffalo; "The Gingival Border from a Scientific Standpoint," Dr. S. B. Palmer, Syracuse; "The Ethical Relation of Dentist to Patient," Dr.

A. C. McAlpine, Warren, Pa.; "Some New Lights on the Etiology of Pyorrhea Alveolaris," Dr. J. B. Ernsmere, Buffalo; (subject to be announced), Dr. R. H. Hofheinz, Rochester; "Surface Markings upon the Teeth," Dr. J. J. Madden, Buffalo; (subject to be announced), Dr. J. N. Crouse, Chicago, Ill.; "Cocain in Pulp Extirpation," Dr. B. S. Hert, Rochester; "Diagnosis and Treatment of Malocclusion" (illustrated with models and appliances), Dr. H. A. Pullen, Buffalo; "Utilization of Artificial Light," Mr. E. L. Elliott, Newark, Ohio; (subject to be announced), Mr. W. A. Purrington, New York.

The committee have under arrangement other important additions. There will be a great many clinics, together with a complete dental exhibit. The committee are making strenuous efforts to make this one of the best union meetings ever held by the societies and well worthy of your attendance. Members of the profession are cordially invited.

DR. F. MESSERSCHMITT, *Chairman*,
138 Main st., E., Rochester, N. Y.

MARYLAND STATE BOARD OF DENTAL EXAMINERS.

THE Maryland State Board of Dental Examiners will hold examinations for certificates to practice dentistry on November 1 and 2, 1901, at the Maryland University, Dental Department, corner Green and Lombard streets, Baltimore, Md., beginning at 9 A.M.

Application blanks and all information will be furnished by the undersigned.

F. F. DREW, *Sec'y*,
701 N. Howard st., Baltimore, Md.

NEW HAMPSHIRE DENTAL SOCIETY.

THE annual meeting of the New Hampshire Dental Society will be held at the Manchester House, Manchester, N. H., November 13, 14, and 15, 1901. All dentists residing in the state are urged to be present. Visiting dentists from out of the state will be welcome. A good program is being prepared.

FRED. F. FISHER, *Sec'y*,
Manchester, N. H.

PHILADELPHIA DENTAL COLLEGE ALUMNI ASSOCIATION OF NEW ENGLAND.

THE second annual meeting of the Philadelphia Dental College Alumni Association of New England will convene some time during the session of the Northeastern Dental Association at Springfield, Mass., October 30, 31, and November 1, 1901. It is desired that P. D. C. alumni practicing in the New England states who are not members of this association communicate with its secretary and attend the meeting.

D. W. JOHNSTON, *Sec'y*,
139 Orange st., New Haven, Conn.

INSTITUTE OF DENTAL PEDAGOGICS.

THE ninth annual meeting of the Institute of Dental Pedagogics will convene on Tuesday, December 31, 1901, and continue for three days, at the Seventh Avenue Hotel, Pittsburg, Pa. The usual New Year Day railroad rates can generally be obtained. A partial program is submitted:

President's address, by G. E. Hunt, Indianapolis; "Conduct of Operatory Clinic" (a method of keeping records, grades, etc.), by G. V. Black, Chicago; "Executive Work of the Faculty" (a symposium), by Drs. Kirk, Patterson, Stubblefield, and Hart; "Metallurgy: How to Teach It," by Dr. Hodgen, San Francisco; "Class-room Methods of Teaching" (a symposium), by Drs. Hoff, Nones, Tenney, and Foster; "Teaching Prosthetic Dentistry," by G. H. Wilson, Cleveland; "Bacteriology: How to Teach It," by W. R. Blue, Louisville. Report of committees: On Operative and Prosthetic Technics, by Drs. Weeks and Hoff.

D. M. CATTELL, *Chairman Ex. Board.*

EDITORIAL.

THE INTERNATIONAL DENTAL FEDERATION.

As had been previously announced in this journal, the first annual meeting of the International Dental Federation was duly held in Cambridge, England, on Wednesday, August 7. The occasion was a notable one in many ways, for at no other time in our professional history has a like organization been formed, nor have the circumstances heretofore existed which could bring together so representative an international gathering for a similar object. The idea of forming an international dental federation seems to have had its origin at a meeting of the Copenhagen Dental Society held in Copenhagen during August, 1894, at which, acting under the suggestion of Dr. George Cunningham, of Cambridge, England, Dr. Haderup, of Copenhagen, presented a paper, "A Proposal for the Foundation of an International Society for Forwarding Dental Education." The proposal was favorably received and discussed at the meeting in question, and a committee of six members from as many countries was appointed, with power to add to their number and to work for the object stated, and within the course of two years to call together an international dental meeting in harmony with the proposal.

At the Third International Congress, held in Paris, in 1900, the idea developed more practical form by a resolution of the Congress creating the "Federation Dentaire Internationale," with its Educational Committee and necessary administrative bureau, which gave it a definite working organization and plan.

In the nature of the case the representatives of the several nations concerned in the work of the organization were without delegated authority, hence the work of the organization was unofficial in its national bearings, its results being of importance only in so far as their suggestiveness or inherent value would be of use in improving dental educational ideals or methods. This lack of official character, as the event proved, instead of being a detriment to the work of the organization, was a positive aid, for the free discussion of the educational problem was not at any time hampered by questions of national usage or expediency.

Sixty delegates, representing seventeen countries, assembled in the Physiological Theatre of the University Museums at Cambridge, and were welcomed by Sir Michael Foster, M. P., professor of physiology and deputy vice-chancellor of Cambridge University, in an address on dental education which in many respects we regard as the most noteworthy statement which has yet been made of the professional status of the dentist and the principles which should govern his education. We hope in an early issue to publish Sir Michael Foster's address in full, but pending its publication it may be said regarding it that it was a practical application to dental education of the principles enunciated by Herbert Spencer in his epoch-making essay on Education,—a clear recognition of the utilitarian character of knowledge and the necessity of shaping education to the uses which the acquired knowledge are to subserve. The problem of the relation of dentistry to medicine was comprehensively stated in his classification of the dentist as a "healer within the limitations of his special sphere of activities" and in his recognition of the necessity for so much of education in the sciences upon which the healing art is based as is necessary to perfect him as a scientific dentist. "While the dental profession doubtless has much to gain in a close alliance with the medical profession, yet one object, and one object only, ought to be the aim of the training of the dentist,—*i.e.*, to make him as sure and as efficient a workman as possible."

So frank a recognition of the special character of the training needed by the dentist and the disregard of ancient precedents clearly implied in the ideal of dental education which he has formulated is at least novel, but, coming as it does from not only a high medical authority, but an authority on medical education as well, is unique, and will carry with it a force which will not fail to make its inherent truth felt in a practical way. The response to Professor Foster's address was made by Dr. Godon, of Paris, president of the Federation, and was a further argument in favor of the special

education of the dentist for his professional work. At a later meeting, held in the hall of Trinity College, a general discussion of Sir Michael Foster's address took place, and was participated in by Professor Griffiths, professor of surgery in Cambridge University Medical School; Professor Sims-Woodhead, of the same institution; Sir James Crichton Brown, Dr. J. Leon Williams, Dr. George Cunningham, Dr. Hesse, of Leipzig, Drs. Brophy, Kirk, and others. A singular and surprising unanimity of sentiment in favor of the principles of dental education as set forth in the address of the distinguished chairman was manifested by all the speakers. It was clearly shown that whatever might be the future organic relation of dentistry to medicine, one central conception and ideal must dominate dental education, viz, that the special and definite character of dental practice demands a system of education for the dentist equally special and definite, and that the best educational system is that which will make the best dentist in the broadest meaning of the term.

The social features of the occasion were important not only in themselves, but also because they contributed much toward the harmony and enthusiasm with which the conclusions of the Federation were reached. A luncheon given to the members by Sir Michael Foster in the Combination-room of Trinity College was an event long to be remembered, and a practical recognition upon the part of an ancient and liberal institution of learning of the dignity and importance of our professional craft. At the formal banquet held in the evening at Downing College, Cambridge, an opportunity was given in the post-prandial speeches to still further emphasize the importance of the objects of the Federation, and upon the part of the guests to in some measure express their appreciation of the generous hospitality which had been accorded them. At the close of the banquet a lawn *fête* was given to members of the Federation by Dr. Cunningham at his home, Merton Hall, where until a late hour the members enjoyed the opportunities for social intercourse and a further strengthening of the bonds of international confraternity.

We have on previous occasions referred to the great value of the social side of our dental meetings. All have recognized this factor in our local and national gatherings. The need for a better understanding in an international way has long been recognized, but no suitable occasion has heretofore offered outside of the international congresses. The meeting of the Federation was brought about for the avowed purpose of supplying the opportunity for a better and closer international relationship in matters dental, and in that re-

spect it was a success beyond all the expectations of its promoters. It has established a condition of international respect and regard which will certainly strengthen the work of dental education and our professional status the world over by familiarizing each with the national conditions in all other countries, and we trust will finally lead to the evolution of an ideal dental curriculum worthy of universal adoption.

A feature of great contributory interest and importance to the work of the Federation was the annual meeting of the British Dental Association, which was in session for three days in London previous to the meeting of the Federation in Cambridge. It has for many years been a desire of the editor of this journal to attend a meeting of the British Dental Association, for several reasons, but especially to know by practical experience the method of conducting a great national dental meeting in accordance with the English ideal. The experience was in all respects satisfactory, and there was much that would be worthy of adoption at our own meetings in this country. There were the usual features of a large dental meeting,—a formal address by the president, scientific essays by members, and discussions thereon, clinical demonstrations and exhibits of dental goods. The two most impressive features to the visitor, apart from the excellence of the program, were the system and the good order which prevailed in all departments. It was gratifying to observe that while our English relatives occasionally gave evidences of pugnacity in their debates, especially when a representative from the Emerald Isle manifested a desire to enliven the proceedings by directing the immature British mind along the strait and narrow way, nevertheless at no time did the temperature of debate tend to force it beyond the reasonable limits of parliamentary procedure, and as a consequence the orderly character of the meeting was at no time jeopardized. Our gratification in noting this feature of the meeting grows out of that human sympathy which animates all individuals with a common feeling, even though it may be the expression of a common weakness. The arrangement of clinics was particularly good; each operator had a space barred off so that he was free from physical interruption by his audience, yet was close enough for all to see the work or hear its explanation. A placard conveniently placed announced the operation and the name of the operator. The program and the operation of the executive bureau were both excellent, so that the visitor was always able to keep himself fully informed of the progress of events and to find his way easily to the several points of interest.

But beyond all else of interest let us hasten to record in fullest

terms of appreciation the cordial reception and generous kindly hospitality which was accorded to their American visitors. We have no doubt that the visitors from other nations will have the same story to tell, but the telling of it we leave to them. It did seem, however, that the cordiality and warmheartedness with which the American delegates was received was special in character, and indicated something deeper than the mere expression of professional brotherhood. It has been more than once said that professional jealousy existed between the dentists of Great Britain and America: let us now and forever forget that any such mistaken idea ever existed. The attitude of the British Dental Association, both as an association and from the point of its individual membership, was a practical and convincing demonstration of the entire absence of any such feeling on their part.

Taken together, the two meetings here referred to have done much to bring about a better understanding among the representatives of the dental profession in all countries, so that one of the greatest obstacles to the scientific and professional advancement of our calling has been removed.

The next meeting of the Federation will be held in Stockholm, where more definite studies of the subject of dental education, it is hoped, will result in still greater advances toward an ideal dental curriculum and a unification of our professional interests.

DR. MICHAELS' WORK IN SIALO-SEMEIOLOGY.

At the Third International Congress, held in Paris in 1900, a paper which attracted much attention was that by Dr. J. P. Michaels, of Paris, on Sialo-Semeiology, an abstract of which was published in connection with the report of the Congress in this journal (see issue for December, 1900). The paper not only showed much patient and intelligent research, but presented results which tended to show that the saliva is a much more important and complicated secretion than it has heretofore been considered to be.

Michaels' study led him to the conclusion that the saliva held in solution all of the crystallizable substances which are the waste products of nutrition and which were, by reason of their crystalline and soluble character, dialyzable through the structure of the salivary glands. He found that by reason of the foregoing facts the saliva furnished a reliable picture of the nutritional status, and became therefore a trustworthy medium for the diagnosis of diathetic states. Moreover, his investigations have led him to the

still more important conclusion that in many diseases in which the prodromic or predisposing condition is dependent upon some departure from the normal biochemical processes of the cells of the body a corresponding alteration in the composition of the salivary secretion takes place which in general terms is characteristic of the disease state, and that this correlation of salivary composition with a given morbid process furnishes a ready and certain method of diagnosis not only of the disease when it is fully established, but what is still more important, of the prodromic stage of the disorder. He has, after a comparative study of the two fluids, given a place of superior importance to the saliva rather than to the urine, as more accurately representing the status of bodily health and having therefore a higher diagnostic value.

The formal presentation of the subject in the paper embodying his results impressed the reader with two dominant ideas in relation to the subject, viz., the far-reaching importance of his conclusions, if correct, and the intricacy of the scientific features of the subject. As to the importance of the research, it cannot be doubted that it opens a new field which, if his major premiss is based upon accurate observation, will throw much light upon pathological states in general; but what is of importance to us as dentists, it promises to shed much light upon the morbid processes with which we have to deal, especially as to susceptibility to and immunity from dental caries and so-called pyorrhea alveolaris. The intricacy of the scientific side of the investigation becomes much less formidable when the actual mode of research is practically studied.

It was the good fortune of the writer to spend two weeks in the laboratory of Dr. Michaels during August, and to study under his personal supervision the details of the methods by which his results had been reached. No one can practically investigate the question and listen to the argument of this enthusiastic savant without being convinced of the general accuracy of his views. The methods which he has brought to bear upon the study of saliva are extremely simple and accurate, but the intricacy of the subject rests in the training of the powers of observation and judgment in order to correctly interpret the phenomena presented by given specimens of morbid saliva and to reach therefrom a trustworthy diagnosis in all cases.

Such is the importance of the subject that for the future it is safe to predict the inclusion of the study of sialo-semeiology in the course of instruction in both medical and dental colleges as a necessary part of professional training.

THE GENERAL PRACTITIONER AND THE MOUTH.

It is clear to all observers that, in spite of the close relationship between medical and dental science, the general practitioner as a rule does not accord to the mouth a degree of importance proportionate to its bearing upon the maintenance of health. This involuntary overlooking of oral disturbances by the medical practitioner has been in some cases productive of fatal consequences. Fortunately, this condition of things is not now a stationary one. The surgeon and physician are beginning to give to the mouth the attention to which it is entitled, and it is probable, judging from recent developments in medical science, that before very long the mouth will be looked upon by the medical practitioner as the source of many maladies at present considered to be of doubtful etiology.

In the *Therapeutic Gazette* for July, 1901, Dr. Bidwell gives a detailed description of the treatment to be followed before and after abdominal operations, and devotes a few well-considered lines to the mouth and teeth. He says, "Attention to the state of the mouth is of importance, not only in preventing decomposition of the stomach contents, with constant vomiting and diarrhea, in preventing septic broncho-pneumonia, which has been a fruitful cause of death after stomach operations, but also in preventing the formation of a parotid bubo, which may lead to suppuration and exhaust the patient's strength."

This important question of the relationship of the mouth to the general state of the organism is as yet in its infancy, although its vital nature has been repeatedly pointed out in medical and dental gatherings.

Dr. William Hunter discusses this topic in a carefully written article published in the *Practitioner* for December, 1900. This is one of the most important papers bearing upon this question from a medical standpoint.

In the opening address of the Third International Dental Congress, Professor Godon also emphasized the rôle of the dental surgeon, and the absolute necessity of maintaining the region under his supervision in a condition of health.

The recent works on buccal semeiology and the ever-increasing enthusiasm of some of the members of both the medical and dental professions in the study of constitutional disorders of dental origin, and *vice versa*, warrant the assertion that the important part played by dentistry in the conservation of health is being more fully appreciated.

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NEW MODES OF THOUGHT: BASED UPON THE NEW MATERIALISM AND THE NEW PANTHEISM. By C. T. STOCKWELL. Boston, James H. West & Co., Publishers. Pp. 150. Cloth, \$1.00.

Dr. Stockwell has already entered the domain of speculative thought with no uncertain tread by the publication of his work on the "Evolution of Immortality." In the present volume he has shown again a striking ability to handle an abstruse subject with great clearness and directness. The matters of which he treats appeal in some manner or degree to every thinking individual. The meaning of life, the interpretation of those phenomena of mind which transcend the material and ponderable features of existence, but which after all are the most real ones, present themselves as never-ending objects of speculation and curious inquiry. The book before us blazes a new pathway into the unknown, and whether or not its point of view or its conclusions may find general acceptance, it will by reason of its lucid treatment serve as a help to the student of psychic development, and by its optimistic quality encourage to hopefulness of character and a stronger faith in the divine purpose for good in the outcome of our problem of life. The development of a conception of divinity in life from a basis of materialism in the sense in which the author uses those terms seems to us thoroughly logical and satisfying.

OBITUARY.

DR. HENRY S. NASH.

DIED, September 12, 1901, in Bellevue Hospital, New York city, from acute indigestion and complications, HENRY S. NASH, aged sixty-nine years.

Dr. Nash, born in Groton, N. Y., of a wealthy and influential family, had the advantage of the best educational facilities of the region. He graduated from New York State College and then entered upon the study of medicine, but before completing his medical course became associated with Dr. Amos Westcott, of Syracuse, as a student of dentistry, and was afterward an assistant in the office of Dr. Robert Arthur, of Baltimore. Being naturally gifted with a wonderful delicacy of touch and remarkable manual deftness, Dr. Nash became one of the most successful operators in dentistry, having a splendid practice in New York city for over thirty years.

In 1897 he issued the first volume of a work, entitled "Loosening Teeth, or Chronic Alveolitis," which is a valuable addition to the study of this much-discussed disease. Unhappily the demands of his practice, advan-

cing age, and failing health prevented him from completing and publishing the second volume. He was engaged in this work when, in January last, his health broke down and he was obliged to relinquish all forms of mental effort.

Dr. Nash never married, but lived in apartments in New York city.

PERISCOPE.

MOUTH-BREATHING.—In an address on "Mouth-breathing and its Relation to Diseases of the Throat, Ear, Nose, and Accessory Cavities," recently delivered before the British Laryngological, Rhinological, and Otological Association, Mr. Mayo Collier spoke as follows: "And now I come to a subject the importance of which cannot be overrated. It is the association of chronic turbinal distention and hypertrophy with, in many cases, a state of things as exemplified by these casts. The association of mouth-breathing with high palate, unsymmetrical upper jaw, prominent nose, open mouth, and thin, flattened face is a constant one. On attempting to reason this subject out at a meeting of the Odontological Society I was met by a perfect hurricane of adverse criticism. I was told that all these cases were hereditary and there was nothing more to be said on the subject. It reminded me very much of the reception a dog gets in the streets of Constantinople if he happens to leave his own street and wander to another. Whatever meaning the members of the society attached to the term 'heredity' they are welcome to, but it at all events does not mean that any given person with a facies such as I have indicated must of necessity be born with the same. I am old enough now to have seen many instances of children with beautifully formed faces, symmetrical dental arches, and perfect nasal respiration become in after life quite altered. The upper arch has become so distorted that the molar teeth on each side are approximated so that the teeth of the upper jaw rest only by their edges on the teeth of the lower jaw, whereas the incisor teeth of the upper jaw protrude forward and hang in front of the incisor teeth of the lower jaw. The whole of the upper jaw may become atrophied, the nasal respiration almost entirely suspended, and the palate highly arched and V-shaped, and the mouth constantly open. Why this change? Was it the evolution of the hereditary tendency which in these cases did not exist, the parents in all these instances having remarkably well-formed upper jaws and being particularly good-looking? I can produce the same effect on any young animal chosen indiscriminately by blocking its nose for a long time with cotton-wool. Is it unreasonable to suggest that turbinal atony and hypertrophy in the young and growing subject will act as the piece of wool in the nose of the young animal?"

"From what I have said as to the alteration in the air pressure inside the nose consequent on anterior occlusion you will gather that a small increase of pressure from without constantly applied on the walls of the nasal box is capable of pushing up the palate, disarranging the upper mandibular arch, and causing general atrophy and an undeveloped condition of the whole upper jaw. Moreover, if these cases are taken in an early stage and the nasal respiration is restored the constant stream of air passing through the nose molds and expands the upper maxilla and in time the greater part of the deformity will disappear.

"One point more. It is a matter of common knowledge that children affected with post-nasal growths or enlarged tonsils, or both, often become pale, thin, anemic, listless, and generally out of sorts. I myself have never heard a satisfactory explanation offered for this associated condition. I say 'associated,' for the association is fairly constant. In grown-up persons who suffer from post-nasal catarrh and pharyngitis and chronic laryngeal catarrh I have noticed two very prominent symptoms—chronic flatulent dyspepsia and a suffused and at the same time leaden appearance of the complexion.

The skin of the face becomes thick, heavy, and patchy, and often the vessels of the conjunctiva are permanently dilated. I take it that in both cases a large quantity of unhealthy mucus finds its way into the stomach. This in the child probably interferes with nutrition and in the grown-up person is the cause of the dyspepsia. The want of proper oxidation at night is the probable cause of the altered and damaged complexion. Whatever be the explanation it is our common experience that if the nasal respiration be restored and the nose and throat trouble cured, in both cases nutrition improves and the patient is speedily restored to health."—*Lancet*.

A FORM OF STOMATITIS CAUSED BY CATERPILLARS.—Dr. Artault, of Vevey, Switzerland, described before the Paris Society of Biology recently a new form of stomatitis caused by caterpillars of the genus *Liparis*. References to pathological disturbances caused by caterpillars have occurred in the past in connection with general medicine, but never before in connection with oral medicine. Dr. Artault has observed only a few cases of this variety of stomatitis, which is of easy and clear diagnosis. Fever is never present. The lips become slightly tumefied, and upon the mucous membrane erythematous zones can be seen. These are slightly elevated and contain groups of red spots.

Certain varieties of caterpillars produce urticaria when they come in contact with living tissues, and others produce indirectly the kind of stomatitis which Dr. Artault calls *erucic stomatitis* (Lat. *eruca*, a caterpillar which produces urticaria). The disease is brought about by the eating of berries or of cherries contaminated with hairs from caterpillars of the genus *Liparis chrysorrhæa*. This disease is likely to appear only during the months of May, June, and July, as during this last month the caterpillar changes into a chrysalis.

The only precaution to be taken is to thoroughly wash the fruits mentioned before eating them. When the disease sets in Dr. Artault uses topically the tincture of myrtol, which has given him most satisfactory results.—CH. CHARPENTIER, in *l'Odontologie*.

A VALUABLE DEVICE FOR RELIEF OF ABSCESS.—Dr. H. F. Hamilton, of Boston, uses an ingenious method to relieve pressure and also to eliminate pus from abscess cavities. He slips the end of the rubber tube of the saliva ejector over the cavity of the tooth and starts the ejector. The pain always disappears almost instantly. In order to facilitate suction he has devised a metallic tip which he adapts to the end of the rubber tube. This tip is provided with a concave disk soldered a quarter of an inch from the end. The disk is filled with soft gutta-percha, is heated, and is then forced into the cavity, making a tight joint. If the ejector is not powerful enough he uses a bicycle pump, which he converts into an exhausting device by reversing the valve.—*International Dental Journal*.

ETHER ANESTHESIA IN ORGANIC HEART DISEASE.—Finney (*American Journal of the Medical Sciences*, August, 1901) is convinced from clinical experience that in many cases of organic heart disease the administration of ether not only produces no deleterious effects, but seems to be of temporary benefit to the cardiac condition. He thinks the greatest element of danger in such cases is to be found in careless or unskilled administration, not in the ether *per se*.

ARRESTED ETHER ANESTHESIA: OBSERVATIONS OF DR. KRONACHER.—It is unnecessary to use as much ether as generally employed in minor and medium operations. Kronacher for three years has been adapting the quantity to each individual case, and has found a very small amount sufficient to abolish pain, although deep narcosis was not obtained. In extracting twenty teeth from one patient, for instance, she screamed as each tooth was drawn, but afterward stated that she felt no pain. This minimum narcosis is not followed by any after-effects, and the patients retain their consciousness but later have no remembrance of what occurred during the narcosis. The technique is as follows: 1 to 2 drams of ether are poured into an ordinary mask, allowing considerable access of

air; then 2 to 4 drams until agitation is noticed; then a few more inhalations, when the mask can be removed and the operation commenced. Possibly further inhalation of about 3 to 6 drams may be found necessary. The anesthesia thus obtained lasts ten minutes. Even in major operations the ether employed can be restricted to the bare amount sufficient to abolish pain.—*Exchange*.

SALIVARY VOMIT.—Morning vomiting of nearly pure saliva is sometimes observed in subjects suffering from chronic alcoholic pharyngitis. It is distinguished by testing for potassium sulfocyanate with a weak solution of ferric chlorid, getting a blood-red coloration if positive.—*Exchange*.

SWALLOWING OF DENTAL PLATES.—In a paper read before the Société de Stomatologie Dr. Robin reports a case of deglutition of a dental plate from the service of Professor Tillaux. The essayist began his remarks by saying: "The deglutition of prosthetic pieces is not a rare occurrence. It is seldom that any serious consequences follow an accident of this nature, for in the majority of cases the swallowed piece follows the digestive tube and is expelled as inadvertently as it was swallowed. But if the piece remains somewhere in the digestive tract, on account of its volume or because of the presence of clasps, the consequences are sometimes very serious."

The case that Dr. Robin reported was that of a woman forty years of age who inadvertently had swallowed part of a denture composed of ten teeth and two gold clasps. The plate on account of its volume lodged in the esophagus and was causing the patient severe pain in the epigastric region, accentuated at frequent intervals by reflex vomiting. The portion swallowed was composed of five teeth and one clasp. After ascertaining the exact size of the swallowed fragment, Dr. Tillaux decided on the possibility of pushing it into the stomach. He accomplished the propulsion with a whalebone catheter to which a piece of sponge was attached. Forty-eight hours afterward the piece was expelled.—*Revue de Stomatologie*.

CLEAN FLASKS.—Put a coil of sheet zinc into the water in the vulcanizer and it will prevent the formation of much of the black oxids which form on iron flasks. After using a few times the flasks will soil the fingers but very little.—*British Journal of Dental Science*.

FILLING OF CARIOUS CROWNED ROOTS.—Speaking of the occurrence of caries in the roots of teeth Dr. Ottolengui describes in the *Dental Review* the following case from his practice: "About two years ago I discovered decay under the gum at the distal palato-gingival angle of both central incisors. By packing cotton in these places the gum was forced away, and removal of decay exposed cavities which in depth reached the platinum pins in the crowns, while in width they extended about one-quarter of the circumference of the root. These cavities were thoroughly cleansed and filled with amalgam without removing the crowns."

TEMPORARY SETS.—In inserting temporary sets immediately after extraction it is usually thought advisable to have the anterior teeth project upward about a third of their length into the sockets of the former teeth. In fitting these, however, it is sometimes difficult to decide just where to cut into the cast, as the loose edges of the gums turn inward and obscure the outline of the alveolus while the impression is being taken. To overcome this Dr. Driscoll advises the use of rolls of soft wax inserted into the sockets in such a way as to come away with the impression when this is removed. These are then trimmed to the depth the teeth are intended to go, the result being that the teeth, if adapted to the model, will go to place in the mouth without infringing upon either the gum or the alveolus.—*Items of Interest*.

RULES FOR THE ADMINISTRATION OF COCAIN.—

(a) The dose of cocain to be injected should be proportionate to the extent of surface to be anesthetized; it should never be more than eight or ten centigrams.

(b) Cocain should never be used on persons suffering from cardiac affections, from chronic diseases of the respiratory tract, or from disorders of the nervous system.

(c) It should be injected *into* and not under the dermis of the mucous membranes or of the skin. This is the intradermic method of Professor Reclus in place of the hypodermic method. In this way the introduction of the substance within the veins, a condition that has occurred in several accidents recorded, will be avoided.

(d) The injection should always be performed with the patient in the horizontal position. Afterward if the operation is about the head the patient can be placed in the required position.

(e) The cocain should be absolutely pure. Certain mixtures of cocain with other alkaloids are of a particularly toxic nature.

(f) The quantity of cocain to be used in a single injection should be divided and a lapse of a few minutes should be allowed between the first partial injection and the following. During this period it will be easy to observe if any toxic effects take place,—for, as is well known, these will occur immediately after the first injection. This is the method of fractional injections.

(g) When used in this gradual and methodical way cocain presents over the other general anesthetics (chloroform and ether) advantages upon which there is no occasion again to insist, and which merely need mention: Absence of general effects, of a period of excitement, of loss of consciousness, the possibility of operating without the aid of an assistant, as the dentist's intervention is consecutive to and not simultaneous with the introduction of the anesthetic agent.

(h) The duration of the anesthetic effect is always sufficient for the performance of all the operations of ordinary surgery.—*Journ. de Med. de Paris.*

[By "dermis of the mucous membrane" in paragraph (c) the author means the connective tissue corium which underlies the epithelial layer.—Ed.]

ANESTHESIA BY MEANS OF SUBCUTANEOUS INJECTIONS OF SCOPOLAMIN AND MORPHIN.—Basing himself on the antagonistic properties of scopolamin and morphin (the first accelerating respiration and lessening the cardiac action, while the second acts in an opposite manner), Dr. Schneiderlin, of Emmendingen, tried some time ago to associate these two drugs in order to produce anesthesia without the aid of another anesthetic. His trials were crowned with success, as he was able to perform painlessly an amputation of the leg, a resection of the foot, etc. But the method devised by Dr. Schneiderlin could not be recommended for general use, as he was not sure of the action of these alkaloids and had to make many injections in order to determine the dosage. Dr. Korff, of Fribourg-in-Brisgau, who has recently undertaken the study of this question, has directed his attention especially to simplify the method, and has regulated the technique in a uniform manner. He has performed in the service of Dr. Schinzing, professor of surgery in the faculty of medicine of Fribourg, a series of trials consisting in the double injection at an interval of two hours of 0 gm. .0006 decimilligrams of bromhydrate of scopolamin and 0 gm. .02 centigrams of chlorhydrate of morphin. But, instead of endeavoring, as did Dr. Schneiderlin, to obtain anesthesia by repeated and increasing doses of the two alkaloids, Dr. Korff also administered chloroform whenever circumstances indicated that the anesthesia would be incomplete,—that is, an hour after the first injection. Following this method only very small doses of chloroform needed to be used,—sometimes no more than a few drops. Dr. Korff claims that the patient does not feel any of the annoying sensations accompanying chloroformization, the anesthesia is not disturbed by vomiting, and after the operation the patient is not restless, but on the contrary sleeps quietly for a few hours. He has used this method of anesthesia on eighty patients, and with the exception of the case of a man of eighty-two years of age, in whom after twenty-four hours a low delirium and excitement developed, he has had no accident whatever to record.

Sometimes Dr. Korff makes three injections of 0 gm. .0004 decimilligrams of bromhydrate of scopolamin and of 0 gm. .01 centigram of chlorhydrate of morphin every one and one-half or two hours. In children between seven

and ten years of age the first medicament is employed in doses of 0.0001 to 0.0002 decimilligrams, and the second in doses of 0.003 to 0.005 milligrams.—*La Semaine Med.; Arch. de Stomatol. et Journ. de l'Anesthésie.*

[Scopolamin is the alkaloid of scopolia, the connecting link in botany between atropa and hyoscyamus.—Ed.]

TIC DOULOUREUX.—According to *Merck's Archives*, Dr. Grandclement has successfully treated several cases of tic douloureux with hypodermic injections of antipyrin and cocain in combination.

TO PREVENT CLOUDING IN MOUTH-MIRRORS.—Dr. Aufrecht has devised the following method for this purpose: The mirror is first submitted to boiling water, and then placed in a one-half of one per cent. solution of lysol. This method has the double advantage of sterilizing the mirror and of preventing its becoming clouded.—*Monatsschrift f. Ohrenheilkunde.*

TO CLARIFY WAX.—Melt in hot-water bath, then remove from water bath and bring to a slow boil on the stove. Into the boiling wax pour a fresh egg, and stir for three or four minutes till the egg is thoroughly cooked. Strain through a piece of cheesecloth, to remove all pieces of egg, and you will have your wax as clean and pure as when brought from the dental depot.—*Items of Interest.*

A CONVENIENT METHOD OF ADDING NEW TEETH TO OLD PLATES.—Dry the plate and stick on a piece of soft wax opposite where each tooth is to be added. Replace the plate in the mouth. If the case be one where the teeth to be added are to replace some which have been extracted, press the soft wax up over the gum. This gives you an impression of the part with the plate in place. While the wax is still soft have the patient close the mouth. This gives you an articulation opposite the places where the teeth are to be added. While the mouth is shut see that the wax is not forced away from the gum by the occlusion. Then with a pledget of cotton dipped in cold water the wax can be hardened in a moment. Remove the plate and run the cast. As soon as hard, turn over, and run a little plaster in the articulation, letting it extend to a couple of teeth on the plate. The teeth may now be ground and articulated. This method saves much time for patient and operator, insures accuracy, and may all be done by the laboratory assistant except the taking of the impression and articulation.—R. E. SPARKS, in *Dominion Dental Journal*.

BISMUTHIC STOMATITIS.—Muhlig (*Münch. med. Wochenschrift* and *British Med. Journal*) states that though chemically pure subnitrate of bismuth is absolutely non-toxic when given internally even in such large doses as 5 drams daily, its application to wounds is not as safe as is usually supposed. The following case illustrates the possible danger of bismuth as a surgical dressing:

On December 14th a man was burned deeply on both forearms and hands, on the right arm, and over the right clavicle and right side of the neck. The wounds were dressed with linimentum calcis, and a few days later were covered with bismuth subnitrate in powder under a dry dressing. On January 5th slight salivation and a bluish black line on the gums appeared. On January 10th the whole of the buccal mucosa, the tongue, the palate, and the uvula were of a blue-gray color, swollen, and, in part, superficially ulcerated. Salivation became marked, the mouth could be opened only with great difficulty and pain. Although the bismuth dressing was abandoned on the first appearance of symptoms, no improvement in the stomatitis took place until the wound was scraped with a sharp spoon in order to remove the remaining bismuth. By February 2d there remained only a grayish discoloration, and this disappeared shortly afterward. The teeth were unaffected.

[In an interesting communication to the International Dental Congress, published in the *DENTAL COSMOS*, December, 1900, page 1300, Dr. Loup discusses the rôle of mercury in mercurial stomatitis, and proves that mercury is not the active cause in "mercurial stomatitis." He says, "Stomatitis is a parasitic disease of an epidemic form having no other etiology

than the microbic one, and appearing all at once as the consequence of general or local manifestations." Further on he says, "The so-called mercurial stomatitis is the same as all other forms of stomatitis." The statements of Dr. Loup are applicable to other chemical intoxications,—that of bismuth for instance. But it should be recalled that bismuth is not eliminated through the oral mucous membrane, hence it is not clear how it could have modified the buccal tissues to the extent of favoring the development of the microbes producing stomatitis.—Ed.]

FOR PERIOSTITIS.—The following is recommended for periostitis: Iodin crystals are dissolved in absolute alcohol until it is completely saturated. A mixture is then made of one-third of this solution, one-third of aconite tincture, and one-third of chloroform.—*British Journal of Dental Science.*

TO REMOVE PLASTER.—If plaster adheres to vulcanite plates after vulcanizing, put the plates in warm water and add about two drams hydrochloric acid, and in half an hour they will be clean and free from odor. When taken out, wash in water containing a small quantity of sodium carbonate to neutralize the acid from the process.—DR. GENESE, in *Ohio Dental Journal.*

TO REMOVE TEETH FROM A RUBBER PLATE WITHOUT DANGER OF CRACKING OR ETCHING THE TEETH.—Boil the plate in glycerin, in a porcelain pan, till it smokes; the teeth will then come away clean and free from discoloration. Put them back in the glycerin till cold to anneal them, and when cool wash in warm water. They will be as bright as when new, and also free from grease. When cold the glycerin can be bottled for further use. Unlike oil, it is odorless when used hot.—*Ohio Dental Journal.*

TREATMENT OF BURNS WITH PURE CARBOLIC ACID.—Dr. J. L. Muench, in the *Medical News*, thus gives the rationale of the treatment of burns with pure carbolic acid: "Externally, carbolic acid acts as an escharotic when applied in the pure state, combining with the tissues and destroying them. Strange to say, however, its action on a burned surface as an escharotic is neutralized by the albuminous effusion becoming coagulated, and local anesthesia of the peripheral nerves takes place. The general result on burns treated with carbolic acid is that there is complete exclusion of air and coagulation of the serous effusions, and the healing process takes place with much less suffering and in a shorter time than by any other method."

ETIOLOGY OF PHOSPHOR-NECROSIS.—Prof. Ralph Stockman contributes to the *British Journal of Dental Science* an extended article on phosphor-necrosis, dealing especially with the etiology of this disease. He believes that the cario-necrosis of the jaw is not due to a specific action of phosphorus fumes, but to a microbic infection. He draws this conclusion from his studies of individual cases, having analyzed the pus from six cases of phosphor-necrosis. He believes that the bacillus tuberculosis is the active cause of the disease, and supports this opinion by several weighty arguments. A proof of the tuberculous nature of the jaw disease, he says, is to be found by looking through the accounts of post-mortem examinations of fatal cases. In most cases, death occurs from tuberculosis of the lungs. Whether this is due to infection from the jaw tubercle, or whether the phosphorus fumes damage the lungs and make them more susceptible to direct infection, I am unable to say. General tuberculosis is also not uncommon, while tubercle of the abdominal glands, and tuberculous ulcers from infection by swallowing the pus, abscess in the brain, purulent pleurisy, and tuberculous meningitis, are all occasional causes of death. Hectic fever and emaciation always accompany fatal cases.

The part which the phosphorus plays is not far to seek. The acid fumes (phosphorus and phosphoric acids) produced by its oxidation in the air have no effect on bone covered by gum or mucous membrane; but when they can penetrate to the bone directly through the aperture left by a decayed or extracted tooth or any injury, they erode the bone, weaken its nutrition and resisting power at this small spot, and make it susceptible to infection by tubercle bacilli.

THIERSCH'S SOLUTION FOR THE STERILIZATION OF INSTRUMENTS.—On account of its combined cheapness and efficacy, this solution is recommended by Dr. J. D. Patterson, in the *Western Dental Journal*. Its constituents are—Salicylic acid, 2 parts; boric acid, 12 parts; distilled water, 1000 parts.

POLISHING CROWNS.—To prevent marring a gold crown when polishing, wet the inside of the crown with soap solution, fill it with modeling composition, and, while the latter is still soft, thrust the end of a stick or instrument-handle into it. When the crown is finished, soften the composition in warm water and remove.—*Dental Hints*.

DUPLICATING PLASTER MODELS.—Dr. Eugene Müller, in *Schweizer Vierteljahrsschrift*, gives the following method of duplicating plaster models: Allow about 150 sheets of ordinary gelatin to stand for one or two hours in cold water. It is then cooked and into it from 120 to 150 grams of oil are incorporated. The model is then placed in an enameled vessel, and the mixture is poured over it. After three hours the impression will have hardened, enabling one to make a facsimile of the plaster model.

TO PREVENT PAIN WHEN INSERTING HYPODERMIC NEEDLE.—The spot where the needle is to enter is touched with a toothpick dipped in pure carbolic acid. A white spot immediately appears, due to the coagulation of the albumen of the tissues. Shortly afterward, perfect anesthesia of the spot is manifest and the hypodermic needle can be pushed through the skin without pain at this point, and the infiltration of the tissues begun. If a large area is to be injected, several spots are marked in the same way for insertion of the needle.—*Medical Times*.

FOR BLEEDING AND TENDER GUMS.—

R.—Gelatin, 30 grains;
Sodium chlorid, 8 grains;
Carbolic acid, 2 grains;
Beta-eucain hydrochlorate, 8 grains;
Cocain hydrochlorate, 2 grains;
Distilled water, 3½ ounces.

S.—Use as a mouth-wash.

—*Merck's Archives*.

A FAVORABLE CASE FOR CHLOROFORM.—Mr. A. E. Francis, of University College, London, read before the Society of Anesthetists a report, published in the *British Journal of Dental Science*, of a case in which the administration of nitrous oxid to a girl ten years of age gave rise to "slow, shallow respirations, great lividity, and enormous venous distention,—the heart on auscultation and percussion being found to be distinctly distended and a systolic murmur being heard over the displaced apex. The recovery was good, and on a subsequent occasion when chloroform was used no trouble followed."

[This is another case in support of the opinion of many surgeons that chloroform is very well tolerated by children.—Ed.]

HINTS, QUERIES, AND COMMENTS.

GRINDING OF THE TEETH.—I was consulted the other day by a man who, living in a boarding-house, drove all his neighbors away from his allotment by reason of the furious gnashing and grinding of his teeth at night during sleep.

Examination of the mouth disclosed a perfect set of teeth not offering the slightest opportunity for the attachment of a denture anywhere within the arch; therefore, I decided to make an entirely vulcanite plate covering the

hard palate and overlapping the bicuspid on each side, getting attachment by means of the necks of these teeth on the lingual aspect. The plate when sprung into position remained in place, serving as a gag and occasioning no inconvenience. It met the case.

This being a singular experience to me, I want to know whether this is the only way to deal with such cases, or whether it is possible to treat them differently.—W. N. JEFFERY, D.D.S., *Perth, West Australia, July 1, 1901.*

"NORMAL SOLUTIONS FOR LOCAL ANESTHESIA."—The Periscope of the September number of the DENTAL COSMOS contains an excerpt from the *Journal of the American Medical Association* on the "Necessity of Normal Solutions for Local Anesthesia," and the following formula is given: "Eucain B 1, sodium chlorid 8, distilled water 100, at body temperature." This formula calls for an equivalent to $7\frac{1}{2}$ per cent. of sodium chlorid. Recipes directing somewhat similar saline solutions have also appeared recently in several other journals; but as both the DENTAL COSMOS and the *Journal of the American Medical Association* are carefully edited and standard authorities, whose statements are generally regarded as *de facto* truths by the entire professions they represent, might an inquiry be ventured as to whether the quantity of sodium chlorid mentioned is not excessive and rather stronger than necessary for an isotonic "normal" solution? Might there not be a possibility of a mistake in the placing of a decimal mark having been made by some one who originally intended about eight-tenths of one per cent., and this error continued by others in due sequence? By way of digression, would it not be a good idea for the avoidance of mistakes in medical and dental formulæ, when any decimal fractional part has to be expressed, to always do as is done in the mechanical arts, place a nought (o) before the decimal mark, thus clearly indicating that less than unity is desired?

While there appears to be no fixed standard agreed upon for a "normal salt solution," it would seem to be generally understood that a little less than one per cent. of sodium chlorid fulfills all requirements. Some say six drams to the gallon of water, which represents about six-tenths of one per cent., others say seven-tenths of one per cent., and Dr. Potter in his *Materia Medica* gives it as 0.65 per cent.

Over two years ago, as may be observed by the inclosed clipping from the *Stomatologist*, of October, 1899, one per cent. of eucain B in what was essentially a normal salt solution (a little less than one per cent. of sodium chlorid in distilled water) was generally used by the students in the clinics of the Philadelphia Dental College for local anesthesia in extractions, and while not proving quite as complete an obtundent as some of the cocain solutions used, it gave and still gives satisfactory results to both patient and operator, at the same time presenting the additional virtues of safety combined with freedom from sloughing and other undesirable after-effects.

This solution is similar to the one quoted, with the exception that only about one-tenth of the sodium chlorid is used. That a large percentage of salt is not requisite may be easily seen from the fact that the Schleich formulæ, which created such interest in medical circles about five years ago, called for only three grains in three ounces of water, or about one-fifth of one per cent.—THOMAS J. MCLERNON, D.D.S.

[As suggested, it was through the unfortunate omission of the decimal mark that in the formula here commented upon the sodium chlorid appears in the proportion of eight per cent. when it should be in the proportion of .8 (better 0.8) or one-eighth of one per cent.—ED.]

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

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LIST OF UNITED STATES PATENTS PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING AUGUST, 1901.

- August 6.*—No. 680,119, to FRANK A. BREWER, JR. Dental forceps.
 " 13.—No. 680 365, to WILHELM STARK. Tooth brush.
 " —No. 680,389, to PIERCY B. McCULLOUGH. Device for forming models of crownless tooth-roots.
 " 27.—No. 681,224, to ABRAHAM H. JACOB. Dental forceps.
 " —No. 681,535, to JOHN W. FOWLING. Dental impression cup.

THE

DENTAL COSMOS.

VOL. XLIII. PHILADELPHIA, NOVEMBER, 1901.

NO. II.

ORIGINAL COMMUNICATIONS.

SOME THOUGHTS ON THE PACKING OF GOLD.

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(Read before the New York Odontological Society, April 16, 1901.)

AT the last meeting of the Second District Dental Society of the State of New York the question of "extension for prevention" was discussed in an unusually earnest manner, and attention was focused on the gingival borders of approximal cavities; but very little was said on the technique of gold packing along those borders, and nothing, of course, on the subject of gold condensation in general. Being requested to prepare a paper for this society for this evening, I decided to note down some thoughts on the general subject of the packing of gold.

I shall begin by begging our older members to be a little patient with me if I go somewhat into detail in describing the old-fashioned methods of operating. We are likely to have some members of the vigorous young Psi-Omega dental fraternity with us, and I thought it might interest them if I should go over the subject of gold condensation. I cannot do this without giving considerable attention to the old-fashioned methods.

The late Dr. William H. Dwinelle used to say that success in checking decay in a tooth depended on the thoroughness with which a cavity is calked, and that in this particular at least there is a similarity in the vocation of the dentist and the shipbuilder. A leak is naturally the dread of each.

In the early days, some of the unbelievers in the rubber dam used to advocate soft gold, even used wet, rather than cohesive gold used dry, for they said that soon after the dam was removed the cavity would be wet, for cohesive gold could not be used in such a manner

as to keep it dry ; and that a closer fitting filling could be made with soft gold, even if it had to be used wet. Of course we know now that they were wrong in assuming that cohesive gold could not be packed in such a way as to fit the cavity, but they were right in believing that a close fit of any filling whatever is essential in checking decay in a tooth.

They were also partly right at least in assuming that by many operators cohesive gold is packed in such a manner as not to secure a perfect fit, for not every operator has the perfect eyes, the steady hand, the inexhaustible patience, and the dogged determination necessary for such work. The task is such a stupendous one that it is only natural that we should all wish that some plastic may be found that will make as good fillings as can be made with gold. But the conditions to which most fillings must be subjected in the human mouth are so trying that it is a vain hope. We must therefore concern ourselves with gold in its various forms, and I do not think that even yet the last word has been said about its use.

If a tooth would bear such treatment, I presume a perfect filling would be made by melting the gold and pouring it into the cavity, and compressing it while in its molten state. Such a filling would at least be homogeneous, and if it did not "ball" or shrink in cooling, it would fit the walls perfectly. Such a solid and homogeneous filling as this can be made with strictly cohesive gold. It might even be made to fit the walls better than if melted, for it would not "ball" or shrink, and it would be homogeneous, as shown by the fact that such fillings have often been rolled out into plate.

This is the perfect gold filling, but it is made only by the greatest effort on the part of the operator and the greatest submission on that of the patient. Fortunately, it is not often required, for fillings that are far from being homogeneous may preserve the teeth for a lifetime. But they must fit the walls perfectly. This is an indispensable condition. Here, then, we have a standard, and in it an inexorable one. Fillings must fit or fail! Dr. Dwinelle evinced the wisdom of the philosopher when he said we are "calkers."

In filling a tooth with gold, the first question with us, then, is how shall it be done to insure a perfect fit. In every cavity and under all circumstances this is the first condition. Most operators make their fillings unnecessarily homogeneous and strong, but no operator ever yet made a gold filling fit too well. I had rather have a soft gold filling partly or wholly tumble out from lack of cohesion, and so secure its prompt replacement, than to have a cohesive one stand with decay going on under it without the patient's knowledge. In the first instance the chances are that there would be no decay under the filling, while in the second there might be an exposure of the pulp before the presence of decay was known. If this reasoning is correct, our first duty is to pack the gold in such a manner as to secure a perfect fit. This has been the great problem since teeth were first filled with gold.

It would seem to be a very simple thing to fill a little hole in a tooth with a substance so soft and manageable as gold foil or crystal gold, and yet, after all these long years of trial and experiment and

close observation, there is no one distinct method universally adopted by all operators. With many operators the question as to which is really the best method is still an open one. There are operators who from start to finish use cohesive gold, and aim to secure a perfectly homogeneous condition of it; while, on the other hand, I believe there are still some who use soft gold for all operations. Probably the majority, however, make a combination of the two systems in the same cavity.

Over twenty years ago I put a strictly cohesive gold foil filling in the grinding surface of an upper first molar, annealing every piece of gold, and condensing with the mallet in the most thorough manner. On the other side of the same mouth, in the corresponding tooth, in a cavity of the same size and in the same large fissure, I put a soft gold filling, using the old-fashioned diamond points and hand pressure throughout. In this filling not a piece of gold was annealed or a blow struck by any kind of mallet. Both fillings were put in with the utmost care, for the purpose of making a fair test of the two systems. I have watched these fillings with the keenest interest all these years, and I have seen no difference in them. The patient masticates on both sides, so that they have been equally used; and they are both free from pits, and each one has the peculiar luster which we all know is only found on a perfect gold surface. Always forgetting, I am never able to tell when I see them which is the soft and which the cohesive one until I refer to my chart-book.

But this only proves what we have all known,—namely, that perfect gold fillings can be made by either system. It does not prove which filling was easiest to make, as, unfortunately, I did not keep a record of the number of minutes given to each, and of course there could be no means of gauging the amount of energy expended or anxiety involved. The test was made to show which filling would best stand the wear and tear of time. These fillings are in the mouth of a prominent New York physician, and can be shown at any time.

But, aside from all this, we have all known that soft gold fillings can be made to stand the wear and tear of the mouth. I have seen many made by Dr. Edward Maynard far more than a quarter of a century ago that are still as bright and smooth as any made with cohesive gold by the most perfect operators of to-day. But I never yet saw one of his large approximal fillings rounded out to the original contour of the tooth, though I have seen a great many that were built down flush and even on the grinding surface in such a manner as to be subject to great wear and strain, and I never saw one that showed any signs of disintegration. It might be expected that a soft gold filling could only be made perfect in a cavity surrounded by four walls, as in such a cavity the wedge could be used to great advantage; but any one familiar with Dr. Maynard's work must know that soft gold was not subject to that limitation in his hands. He once told me that he never used cohesive gold under any circumstances, and that he never had any trouble in building up approximo-grinding-surface corners with soft gold condensed by the wedging principle. When I showed him a number of large con-

toured cohesive gold fillings made by Dr. Varney's method, and several made by Dr. Varney himself, he shook his head and said that the gold would stand, but in time the teeth would discolor around the fillings, and finally they would decay. This was the judgment of a man who did not believe that any one could perfectly calk a cavity with cohesive gold. His opinion was evidently formed not by the use of such gold, but by the observation of the fillings of others. In his day, he probably had never seen such work as was done by Varney, and later by Webb, and, being a man of strong prejudices, he would not believe that perfect work could be done in their way.

Dr. E. J. Dunning was also an advocate of soft gold, and those who are familiar with his work know that his fillings never leaked. His hobby was "perception at the point," the point being that of the wedge. It is my deliberate opinion that those operators of the old school reached high-water mark in the matter of making tight fillings. Their method also secured homogeneous fillings, and these two conditions have made them so lasting. If it is true that their methods produced such perfect results, then they must be taken account of and applied to-day. For this reason I do not believe soft gold will ever go out of use, but probably it will never be used again exclusively by any one who aims to take first rank as an operator. More is expected of gold fillings to-day than in Dr. Maynard's time, and more can easily be done with cohesive gold than ever could have been done by him with soft gold. To-day gold fillings must be contoured, and for this non-cohesive gold used throughout is out of the question. The idea need not even be discussed.

The discovery of the cohesive quality in gold marked the beginning of a new era in our profession. In addition to being calkers, it has made it possible for us to become builders. As might have been expected, it has brought to the front a class of operators who have been fascinated with the idea of building, and has left in the background those who were content with calking. The object of this short paper is to demonstrate the absolute necessity of each, and to point out if possible the ground on which they can meet in harmony. Or, in other words, to prove that every dentist must be a calker and a builder. Dr. Maynard was a superb calker. If he had lived a generation later, I believe he would have been a masterly builder as well, for no man ever worked more accurately. No dentist to-day can afford to be either one or the other. It is too late. He must be both.

I would not bother to write this paper if I did not believe that soft gold is not enough used. I want to see our profession a little more coquettish toward it, and a trifle more handy with the wedge.

I use the term soft gold in this paper in rather a broad sense, meaning strictly non-cohesive and slightly cohesive, as, for instance, many of the cylinders on the market which are barely cohesive enough to stay in place when packed as pellets, and which are yet soft enough to yield to the pressure of the wedge, and also soft enough to pack without bridging and clogging under the direct pressure of a flat-end plugger.

For a decade our minds have been fixed upon making our fillings solid. I think they should be fixed on making them fit. I think adaptation should be first, and solidity second. It may be said, if fillings are made solid they will fit, but we must not always believe all we hear. Such gold as will easily make a solid filling will not easily make one that will fit, and in the hurry of our every-day practice the best of us need to be on our guard against such gold. In no subdivision of our work is there greater need of good judgment than here. Some contour fillings must be made of the most cohesive gold from start to finish, while some grinding-surface fillings can be made with soft gold, under water even, with the certainty of lasting indefinitely. I have made hundreds of the latter without a moment's fear of their future. Strictly non-cohesive gold, the leaves of which slide upon each other, is the one best suited for the wedge, and wet gold is in this respect like non-cohesive, and can be made dense in cavities with firm walls. Dr. Maynard told me that he never once used the dam, and that it was his constant practice to fill with gold under water if he had to. If the old-time advocates of the wedge sought for absolutely non-cohesive gold, why should they not have success in filling under water?

We are all tired of being told that between two extremes exists a happy mean. But no greater truth was ever uttered. To be well equipped to-day, I think a dentist should be prepared to use soft gold in the old-fashioned way, and strictly cohesive gold in the present manner. For the latter he should use pluggers with flat ends, very finely serrated. The flat ends should be nearly at right angles with the shaft, so that a blow from the mallet or the impact of hand pressure shall carry the gold squarely before it and keep an even surface. This even surface of the filling in building is of the utmost importance. If the gold is allowed to become bumpy, then good-by to accurate work. If I can only demonstrate this one point convincingly, I shall be repaid for writing this paper. All the instruments used for packing cohesive or semi-cohesive gold, either by hand pressure or by any of the mallets, must have flat ends and be finely serrated. To round off the corners of the instruments, making their points egg-shaped in order to better suit the curves of the cavity, would be sure to make an uneven, bumpy surface, and render accurate building more difficult. The points of the pluggers may be large or small, round or square, but they must always be flat on the end. Only with such instruments can gold be packed so that it will be free from minute holes, excepting, of course, with the wedges.

The other class of instruments which are to be used for non-cohesive gold are entirely different, being wedgers instead of builders. They have sharp points, and are either round or square. The square ones were called diamond points by the old operators. They are made of different angles, some being slender with gradual taper, and some being blunt with rapid taper, but all terminating in sharp points. The old operators used these instruments on their sides for packing, as well as for wedging. I shall describe them only as wedgers, for at the present time I think they have no other

use. They came into use in the early days for the packing and condensing of purely non-cohesive gold. They can be used somewhat with semi-cohesive, but not at all with cohesive gold.

Here, then, we have plugging instruments divided into two distinct classes; packers and builders with flat ends, always finely serrated, and wedgers terminating in sharp points. Let me illustrate their uses. In the beginning, I said it would seem to be a very easy matter to accurately fill a little hole in a tooth with gold. We shall see that it is not easy. For instance, let us take a rather small cavity on a buccal or grinding surface of a molar. Such a cavity has four walls, and it can be filled absolutely accurately from start to finish with either strictly cohesive or strictly non-cohesive gold. Admitting that it can be done equally well by either method, we are concerned with the one that will be easier and more certain. If filled with cohesive gold, a retaining pit must be drilled for the first piece, or else the gold must be held in place by a retaining instrument until it will be held by the natural shape of the cavity. The gold must be used in very small pieces, and each piece must be condensed absolutely perfectly before the next one is applied. Any failure here will remain a failure to the end. The bottom of the cavity will be easily filled accurately, because it receives the direct impact of the plugger point; but along the side walls the conditions are changed. Here the plugger point no longer packs squarely against them. The gold is made to fit accurately only by being swaged out against them. The operation, then, from the bottom of the cavity is one of swaging. If the mallet is used, this may be easy, but if it is done by hand pressure great patience will be required. There can be no haste and no distraction of attention, for after the filling is in there will be no way of going back to make perfect that which has been left imperfect. The filling of our little cavity, then, is not a trifling and easy matter. It is one that will test the skill of the best operators in our ranks. So much skill and care is required that probably there are very few who would fill such a cavity throughout with cohesive gold. Most operators would use soft and finish off with cohesive.

Let us now consider the method of filling it with strictly non-cohesive gold. I will first consider Dr. Maynard's method. So far as I know, he never published its details. He belonged to the old school, and he was singularly reticent, except toward those who were sympathetic to him. I was once directed by this society to interview him and request him to give a clinic before its members. He promptly and emphatically, but very courteously, declined. He said he never allowed any one to see him operate. He said the filling of a tooth with gold was a matter of infinite detail; that it consisted in attention to a great many little points that could not be shown, and that it would be disappointing to those who looked on expecting to see something very great performed. I was an advocate and admirer of his rifle, which to-day stands as a monument to his genius, and I found the way to his heart by talking about it, and at subsequent interviews he showed me his instruments and explained their uses. Nearly all of his pluggers were without

serrations, and were designed to use on their sides. Some of them terminated in sharp points, and were used for wedging.

For many years I had supposed that his method of filling was that of using cylinders in a manner I shall soon describe, but his son, Dr. John D. Maynard, of this city, states that he did not use them, but used folded strips of Abbey's soft gold. For instance, in filling a grinding-surface cavity he laid the end of the strip across the end of the tooth, and, holding it at the farther margin of the cavity with a finger of the left hand, or with the mouth-mirror, or an instrument, he carried it with the side of his plugger to the bottom of the cavity, gently pressing it against the side walls. Then with the instrument he folded more of the strip to the bottom of the cavity in the same way, and repeated this until the strip was all packed into the cavity. Another strip was then taken and packed in the same way, but to the right and left, and always toward the side walls. This was continued until the cavity was full. Then with a wedging action of the instrument a hole was made in the center of the cavity, and that was treated as a new cavity, and filled by folding the strips into it in the same manner. Then another hole was made and filled, and this was repeated until it was no longer possible to penetrate the gold. Then the burnisher was used with a great deal of force.

This burnishing was a most important part of the operation. To make the burnisher slip over the gold he sometimes rubbed it on a piece of soap, which was always at hand for that purpose. He kept his burnishers smooth and bright by rubbing them on a long strip of leather, as a barber sharpens his razor. It will be observed that this folding of the gold into the cavity left the leaves lying against the side walls and against each other throughout the filling, like the leaves of a folded book. In folding the gold into the cavity it was allowed to project a little beyond the margin of the tooth, and after burnishing the gold was either filed down or shaved down with a sharp instrument. It is easy to see why his fillings fitted so well, and why they did not pit or flake off with time and wear. This description has been confirmed by his son, and presents his general method of procedure. I have recently seen his instruments, and they are an education in themselves. They were made by him, and every one of them bears the stamp of a master.

The next method I will describe is that of filling with cylinders. I have never been able to learn with whom the system originated. Probably it was of slow growth, and was added to by different operators from time to time. As I understand it, the method was about as follows: The operator would take a quarter, a half, or a whole leaf of Abbey's soft gold, and, folding it into a strip as wide as the cavity was deep, would roll it into a cylinder on the end of a four- or five-sided broach. Sometimes it was rolled on a two-tined instrument made something like a tuning-fork. If a tight, firm cylinder was desired, the gold was rolled tightly from the start. If a loose one was needed, it was rolled loosely. When enough of these had been made to presumably fill the cavity, the operator would stand one on the distal side and would press it only gently

against the walls with the side of an instrument having a wedge-shaped point. He would then place another cylinder by its side, holding it and the first one in place with a retaining instrument, and applying gentle side pressure in the same manner. Please notice that there is as yet no attempt to condense the gold and make it fit the side walls. All that the operator desired was to have the cylinders stand up and keep their places, like cigars placed in a tumbler. The adaptation and condensation was to come later. When the cavity was about half filled in this way, if the cylinders would stay in place he would commence on the other side of the cavity and fill the second half exactly as he had the first. Then with the same wedge-shaped instrument he would somewhere near the edge of the cavity make an opening between the cylinders by applying force rather against the side walls. Into this opening, which had been made as large as was easily possible, he would stand on end another cylinder of suitable size, but always of the same length. This would be condensed laterally, and the new hole filled with another cylinder in the same way. This wedging process would be continued until it was no longer possible to plunge even a slim wedge into the gold. As you readily perceive, this leaves the cavity filled with gold arranged like the leaves of a book, and presenting a surface made up of the edges of these leaves. Such a surface never pits and never flakes off; and it wears smooth and velvety, and is always a pleasure to see.

Theoretically, as described, the gold should be exactly like the leaves of a tightly-closed book, but, as a matter of fact, such is not strictly the case, for the cylinders, being a trifle longer than the cavity is deep, project, and in the final condensing the edges are likely to be folded over and tucked into the little holes made by the wedge. The body of the filling, however, is made up of these parallel leaves, so that the wear comes on their edges; and it is again easy to see why it is that the gold does not pit or flake off under the wear and stress of time. I have seen such fillings that were said to have been in fifty years, and they were still smooth and even.

In mechanics the wedge is the most powerful instrument known, and when used in this way it must be seen that it secures great solidity of the gold and very close adaptation to the side walls. In this filling there are two conditions that should, theoretically as well as practically, render it more perfect than the filling of cohesive gold first described. The first is the lack of cohesion, which allows the leaves of gold to slide by each other under pressure of the wedge; and the second is that the whole force of the wedge is brought against the side walls, thus inevitably securing a perfect fit. In my opinion the weak point of this filling, though it is not a very weak one, is that at no time has there been direct pressure against the bottom of the cavity. Of course the blunt wedge has driven the gold forward somewhat, but the increase of force has been greatest laterally and near the surface, where the diameter of the wedge when used would be greatest. It should then be expected that the leaves of gold resting on the bottom of

the cavity should not be so thoroughly condensed. That this is true is shown by the examination of old fillings made in this way. I have examined a great many of these fillings that have been lost by the undermining of decay, or that I have taken from teeth that have loosened and come out, and I have found a slightly soft condition of the gold at the bottom of the cavity, though hard and smooth on the surface. On crushing these fillings, I have repeatedly had the cylinders fall apart in separate, solid masses. This slightly soft condition at the bottom is of no great consequence when the top is so solid and the fit so perfect. To fill this cavity in this way requires a great deal of time and a great deal of skill. I believe the work can be done in a better manner and in shorter time by proceeding as follows: In the bottom of the cavity I would lay a mat of Abbey's old-fashioned soft gold foil, or a good-sized soft cylinder made by any one of a half-dozen makers; and on this I would lay a pellet of bibulous paper—such as we have prepared for drying cavities—or the end of a strip of chamois skin or of kid. Then with a large-pointed flat-end instrument I should condense this paper or skin exactly as if it were gold. I should go over every part to be sure that the gold underneath was well adapted to the bottom of the cavity. Removing the paper, I should apply more gold, and condense again in the same way. Of course the object of the paper or the skin is to hold the gold to its place, which it does to perfection. I should use it exactly as Dr. Bonwill used it, and as Dr. Darby earlier still used spunk for packing amalgam. If desired, the mallet can be used, and sometimes to great advantage, for soft gold under the intervening paper or skin is not hardened by the mallet blows.

This process can be continued until the cavity is a quarter, a half, or sometimes even three-quarters full, at which time the gold will stay in place, and the paper or skin can be dispensed with. Of course it is of no use except to hold the gold in place, and it can be sometimes dispensed with even earlier in the operation. The mats or cylinders are to be packed as if they were pellets, and always with instruments that are flat on the end and finely serrated. The gold is to be kept even, which is done by using points of rather large size. Small points, or those with deep serrations, would cut the gold and render its surface bumpy. As a matter of course, the gold must be packed very thoroughly along the side walls, but it must also be very thoroughly packed in the center of the filling. In fact, the effort from the first is to condense each piece thoroughly before new gold is added. In this manner the work is continued until the cavity is full, at which time we already have a very perfect filling. We may at least be sure that the bottom of the cavity is accurately fitted with the gold. The gold is very soft and adaptable; it has not moved from its place from the first moment, and all the force, whether of hand pressure or the mallet, has been in one direction, so that each pressure or blow has reinforced all that went before. Not a single piece of gold has been annealed, so that there has been no bridging over. To anneal even a single piece would have defeated the design of the filling. Although soft and hardly

possessing sufficient cohesion to stay in place, yet each piece of gold has remained where it was packed, owing to the fact that the instrument points have been comparatively large and finely but sharply serrated.

But this filling is not yet complete and ready for finishing the surface of the gold. The last mats or cylinders in time would flake off, owing to the lack of cohesion of the gold; and, besides, though it is certain that the gold fits the bottom of the cavity as perfectly as it can, it is not by any means certain that it so fits the side walls. It will be observed that up to this moment no instrument has been used that did not have a flat end, and the gold has been so evenly packed that there can be no appreciable holes in it. In fact, it must be believed to be a solid, close-fitting filling. So it is, and yet the power of the wedge is so tremendous that it can be made to fit more accurately, and can be made more dense and solid. This is done by plunging into any part of its surface a sharp round- or diamond-pointed wedge. Its shape should not be too slender or too blunt, but it should be so tapered that it can be steadily and firmly worked down into the gold, forcing it laterally against the walls and condensing it as no direct hand pressure or mallet force can do. In making this hole a succession of wedges of different tapers may be necessary, since the hole must be made deep enough to hold the new gold which is to be packed into it. Care must be taken not to split the tooth, an accident which may easily happen in careless hands. This hole in the gold is to be treated as a new cavity, and filled with the same unannealed gold and the same flat-end instrument, though very many times smaller at the point. When this is filled flush with the surface, another hole is to be made in another part of the filling and filled in the same manner. This is to be continued until it is no longer possible to thrust the sharp instrument into any part of the filling. After this is done, the burnisher is to be used vigorously, and particularly around the margins. The moment the burnisher is put upon this filling the peculiar quality and texture of the gold will be appreciated. It is so soft and malleable that it reminds one of velvet. This is due to the fact that not any of the gold has been annealed, and on the surface at least the mallet has not been used. When such a filling is dressed down and finished it will present as fine a surface as it is possible to get with any form of gold used in any possible way, and it is a surface that after long years of use and wear will not pit or flake off. I speak confidently on this subject because of long observation of such fillings.

This filling may have no marked advantage over one made by cylinders stood on end as described, though I believe it insures a better fit along the bottom of the cavity; and in my hands it has always been easier to make. For many years I have used paper as described, but more recently I have used strips of chamois skin or strips of white kid, the advantage being that the strips are tough, and, being in one piece, are more easily pulled out of the cavity. Yet the paper is white and clean, and has a good surface for the purpose. Its use for this purpose occurred to me, as before stated, after seeing Dr. Bonwill use it for packing amalgam. I have never

known, or I have forgotten, who first suggested the use of chamois or kid; the idea certainly did not originate with me. It is not by any means a method confined to buccal or grinding-surface cavities which have four walls. I use it constantly in connection with a matrix along the gingival border of approximal cavities in bicuspid and molars.

In addition to the two ways I have described of filling our buccal or grinding-surface cavity, there is still another which meets with favor with a large number of operators. It is that of packing soft gold, without the paper, using flat-end instruments rather coarsely serrated, and filling the cavity about two-thirds full, and then finishing with cohesive gold. Very accurate and lasting work can be done in this way, but I do not think the same perfection can be attained as with either of the two methods I have described, though the cavity can probably be more quickly filled. Dr. Black has somewhere called attention to the fact that a veneering of cohesive gold resting on a mass of soft gold is not placed on correct principles, and does not bear the strain of use and wear as well as when a single kind of gold, of either one kind or the other, is used throughout the whole of the cavity. From the scientific standpoint, I think this is true, but from the practical one I think it is not of much importance if the cohesive veneer is of considerable thickness, and does not depend upon its attachment to the soft gold, but is dovetailed in the cavity as if it were a separate filling. But the advantage of this method applies more particularly to approximal surfaces when it is desirable to get the easy and perfect adaptation of the soft gold in the gingival region and the strength and resistance of the cohesive near the grinding-surface border. Such fillings as these are the ones I had in mind in the beginning, when I ventured the opinion that a uniformly homogeneous and solid condition of the gold is not always necessary for perfect tooth-preservation. It is also what I had in mind when I said that in my judgment perfect adaptation is more important than uniform solidity.

This is a fascinating subject, but I have not time to go into detail with the combination of soft and cohesive gold in all classes of cavities. I want, however, to call attention to some points in the filling of cavities on the approximal surfaces of the bicuspid and molars. You have doubtless felt that I am in favor of reviving attention to the use of the wedge in securing perfect adaptation. That is true, but I have another object in view, and that is to call attention to ease of adaptation of soft or semi-soft gold; using it as if it were cohesive, and condensing it with direct hand pressure or mallet force. And this applies more particularly to the gingival third or two-thirds of most approximal cavities. There are times, however, when on these surfaces I use strictly cohesive gold from start to finish. Only yesterday I filled a cavity on the approximal surface of a bicuspid, using throughout strictly cohesive gold foil No. 4; a half sheet folded to make four thicknesses, and this cut crosswise in strips. The gold was prepared and used in such small pieces because the walls were very thin, and only the most dainty force could be safely applied. The tooth was of very great value, and it

was decayed in such a manner that the greatest possible strength was required of the filling. I will tax your patience by a description of the method I employed, because it presents such a contrast to those I have described. I drilled a retaining point at the gingivo-buccal angle, and then extended the round hole laterally until its length was twice its diameter. I would not have trusted to a single round retaining cavity, and I did not want to drill another one at the gingivo-lingual angle. I gently beveled the sharp edges of this little retaining cavity in order to start the gold with a slightly broader base, and also to give easier access to the little cavity. Then, from start to finish, I used the lead mallet in my own hands, in connection with the mechanical mallet, except that I stood over the patient and by the aid of the mirror packed the gold by hand pressure into the groove on the buccal side near the grinding surface. This groove could not be reached with precision by the mallet points, but it was easily reached and accurately filled by direct hand pressure as described. Not a piece of gold was put in this cavity that was not thoroughly annealed, and in packing not a piece was left until it was thoroughly condensed. This was necessary because the grooves were shallow, and the greatest possible strength was imperative in every part of the filling. No attempt was made to use a matrix. Along the gingival, as well as along the buccal and lingual borders, the gold was packed a little over the edge of the enamel and nipped off with the flat plugger point under the impact of the lead mallet. This is a trick I acquired from Dr. Varney, and is one I have ever since employed when I have had to build a filling without the aid of the matrix. It is a sure means of making a perfect edge, and helps to finish as you go. A filling contoured in this way needs but little finishing. The gold may be nipped off in this way with the mechanical mallet, but I never feel so sure as when I can do it with the soft lead mallet in my own hand. In fact, I wish I had time and strength and endurance to never use any other mallet. It is the only one into which you can put your personality: not the personality of your attendant; not the shattering impact of the automatic; the relentless spite of the mechanical; the fiendish lightning of the electric, but the gentle persuasion and, if necessary, the compelling vigor of your own soul. The operation I have described was an unusual one, and it required all the strength and solidity that could be had from gold. Fortunately, most approximal fillings need not be made in this way.

I know that time is relentless with all our fillings, and that the operation of forces brought to bear upon them in the mouth must change and somewhat weaken even the best of them; but I have made combinations of soft and cohesive gold in approximal cavities for such a long period of time with such good results that I cannot be persuaded that it is not good practice in the majority of cases. In an approximal cavity which opens on the grinding surface of a bicuspid or molar, if an attempt is made to condense soft gold along the gingival border by the aid of paper or kid, a matrix of some kind of course is necessary. Sometimes, however,

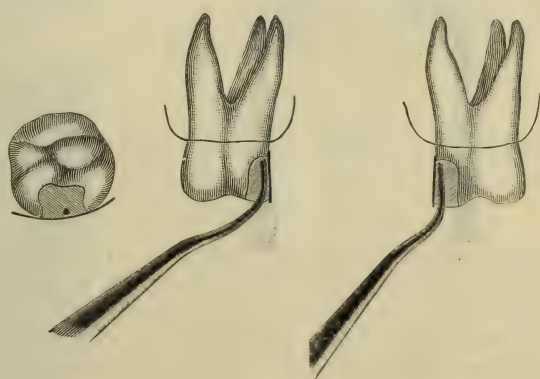
before the matrix is applied a mat of gold can be adjusted and partly condensed, being allowed to project a little beyond the edge of the cavity. Then the matrix can be put in place, carrying the surplus gold before it, thus making more sure a perfect fit along the gingival border. This was a practice very common with my former associate Dr. William A. Woodward. After the matrix is applied, more gold can be added, and then the paper or kid can be used under hand pressure or the mallet, as may seem best. If the matrix is firmly held, force can be applied freely with little danger to enamel-margins along the gingival border, and with great certainty of securing a close adaptation of the gold. When perhaps the gingival quarter or third of the cavity has been filled and the paper abandoned, there must be great care in attaching and packing the gold lest there be disturbance of that already placed. But with great care and the help of a retaining instrument this can be done. When the filling is secure, the change to a more cohesive gold and the building process begins. From this point to the finish the warning conveyed in Dr. Black's remarks relative to a thin cohesive veneer on a soft gold foundation must be regarded. Such practice as this is not justified if the remainder of the filling is not well anchored in good grooves along the side walls and the gold thoroughly condensed.

For packing by hand pressure, as well as to some extent with the different mallets, I have devised two plugger points which are

FIG. 1.



FIG. 2.



intended to reach the margins of enamel with great accuracy. (Fig. 1.) They are made in opposites, and are to be used on the anterior or posterior approximal surfaces of the bicuspid and molars, as the case may be. It is not easy to describe them. They are best shown by the accompanying illustrations. The points have a peculiar rake, by which the greatest pressure is exerted close to the matrix. A cross-section of each point is triangular in shape, as shown in the illustration, the sharp angles fitting perfectly in the triangular space at the juncture of the matrix and the enamel

while filling along the side walls. (Fig. 2.) The ends are flat and finely serrated. I have used these pluggers a great many years, and find them invaluable for packing either soft, semi-soft, or cohesive gold when used as pellets. I fill a great many cavities on approximal surfaces mainly with these instruments. If I do not use the paper before described, I make a retaining point at either the gingivo-buccal or gingivo-lingual angle, and fill this with the usual round-pointed flat-end instrument. When a good start is made, I change to these matrix pluggers, as I call them, and pack along the gingival border with great care and great delicacy. When the buccal or lingual border is reached, I keep the gold in advance, so that it is possible to pack pretty nearly directly against the side walls. Packing steadily back and forth from the buccal to the lingual side, and always accurately by the side of the matrix, secures the perfect shape of the filling and leaves the gold almost finished when the matrix is removed. The tooth-walls must of course be packed against with the utmost care, else in a few years they will discolor and in a few more decay.

Of matrices, there are an almost endless number. There is not time to discuss them here, but I desire to allude to two distinct

FIG. 3.

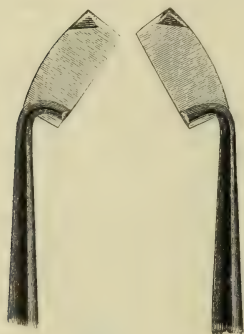
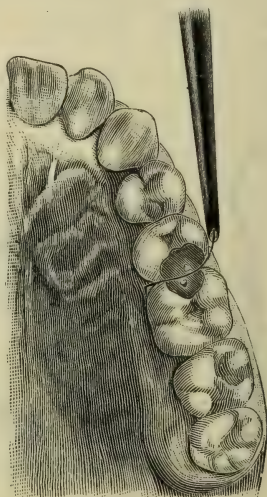


FIG. 4.



advantages to be gained by the use, in favorable cases, of the "hand matrices" which I presented before this society in 1893. (Fig. 3.) These matrices were originally intended for the plastics, but of late years I use them a great deal for gold work. They are made of thin steel or platinum or German silver, and in rights and lefts, with a lug soldered on one end to rest against the adjoining tooth and hold the matrix to its place; and a handle soldered to the other end to hold in the left hand, by which it is to be controlled. The first

advantage is that with the hand the matrix can be pulled tightly, and by means of the inclined plane of the lug made to fit tightly along the gingival border, and at the same time, by means of the handle, it can be turned away from the tooth to be filled near the grinding end so as to give easy access to the cavity. (See Fig. 4.) I know of no other matrix with which this can be done to the same extent. Nor do I know of one that can be readily held so as to guide the filling during its construction, to even an exaggerated contour if necessary, in order to bring it out to meet its neighbor. The second advantage is that it is instantly applied, and at any moment can be removed and reapplied without the least disturbance of any part of the filling which has already been inserted. This is of great importance, as it allows a moment's rest to the patient or operator or gives a chance to examine or perhaps burnish, or even partly finish, the edge of the filling, or to judge of its shape. Of course its range is limited, and it monopolizes the left hand, but in places where it can be used I consider it invaluable. For plastics, it is indispensable.

To briefly sum up, I have then to say that, in the light of all that has gone before, and profiting to the fullest by the experience of the old masters in dentistry, as I will call them, as well as being sympathetic toward and receptive of all that is scientific, and therefore best, in modern practice, the method in general that will give best results is that of the combination of the two systems, even, it may be, in the same cavity. We should therefore be equipped with the instruments and the means for the instant application of either system or a combination of them. And this is again a shining example of the universal fact that the truth lies between the two extremes.

DISINFECTION OF DENTAL INSTRUMENTS BY MEANS OF SPIRIT OF SOAP.

BY W. D. MILLER, D.D.S., M.D., BERLIN, GERMANY.

SOME ten years ago (*DENTAL COSMOS*, 1891, and "Micro-organisms of the Human Mouth," second edition) I reported upon experiments made with a number of antiseptics then in use as to their adaptability for sterilizing dental and surgical instruments. In these experiments I adopted the following method: Small cylinder-shaped pieces of glass, about 5 mm. in diameter and 4 to 8 mm. long, were put into a glass vessel containing some freshly extracted carious teeth, and a few drops of water added. They were stirred about with a glass rod until coated with infectious material, and then dried for twenty-four hours at room temperature or for two to three hours at blood temperature. A number of these objects were now laid in a sterilized glass vessel, the liquid whose antiseptic action was to be tested poured over them, and covered with a somewhat larger glass vessel, to prevent the possibility of infection from air germs during the experiment. At certain intervals, one piece

after another was taken out with sterilized pliers, rinsed with sterilized water and dropped into a tube of bouillon and kept in the incubator at 35° to 39° C.

I purposely subjected the antiseptics to a severer test than they are likely to be put to in common practice, as I am of the opinion that our agents and methods should be sufficient not only to sterilize those instruments which have been previously thoroughly cleaned mechanically, but also instruments in which this precaution has not been taken, seeing that many operators are somewhat lax in the matter of asepsis, or occasionally even of ordinary cleanliness.

As a result of my investigations at that time, I came to the conclusion that the five per cent. solution of lysol was the most effective material we possess for sterilizing the hands and instruments chemically. Since that time various other remedies have been recommended for the purpose, among them formalin and spirit of soap. The former has not been universally adopted, principally on account of its disagreeable, pungent smell and irritating effect upon the mucous membranes.

Spirit of soap, however, has been recommended by various authors since Mikulicz reported favorably upon it in the *Deutsche medizinische Wochenschrift*, No. 24, 1899. As lysol has an odor which to some is unpleasant, and which is easily communicated to the atmosphere of the whole room unless particular precautions are taken, I was much pleased at the prospect of getting an antiseptic possessing all the advantages of lysol without its disagreeable odor. In order, however, to assure myself that spirit of soap is as reliable as lysol, I carried out a series of parallel tests between these two materials by the method given above. Of these tests (fifteen in all), eleven resulted in favor of lysol, one in favor of spirit of soap, and three were inconclusive. From these results I was forced to the conclusion that spirit of soap is not equally reliable with lysol, so that, while I now use it for disinfecting the hands, I still adhere to the five per cent. solution of lysol for the sterilization of instruments.

As repeatedly stated in former publications, I always have two complete sets of instruments in use, and while I work with the one the other lies in the lysol solution for at least half an hour. Burs remain in it for from one to four hours, although after mechanical cleansing one-half hour might be considered sufficient.

I use for the purpose a plain glass vessel filled about three inches deep with the solution. Double-ended instruments I never employ, as it is impossible to sterilize them without laying the whole instrument into the solution. Nor do I use any cone-socket instruments, as infectious matter easily accumulates at the joint where the point is screwed into the handle, which necessitates the screwing off and mechanical cleaning of the point as well as the handle every time the instrument is used.

For similar reasons, dental instruments should be perfectly smooth and polished, and the handles, as far as they come into contact with the mucous membrane of the mouth, should not be ornamented in any way. Particular attention must be paid to the

scalers, as lesions of the gums are scarcely avoidable in using them. Consequently, in addition to the lysol treatment, as an extra precaution, just before using them I dip them into oil of cloves or concentrated carbolic acid and draw them through the alcohol flame, so that the liquid catches fire and burns off. With smaller points, one must see that not more than a minute quantity of the liquid adheres to the instrument, otherwise the temper of the latter is sure to suffer; with larger points, the danger is not so great.

In the same way, I sterilize spoon-shaped excavators, used for clearing out cavities deep under the gums, where the soft tissues are sure to be wounded.

In all cases where infectious diseases of the mouth are present, particularly where any symptom indicates the possibility of syphilis, the instruments must be sterilized with boiling water, about two per cent. of soda being added to prevent rusting. An apparatus, which appears to me adequate for the purpose, has just been constructed by Witkowski, of Berlin. The chief objection to the general use of boiling water for sterilizing instruments lies in the fact that, notwithstanding the use of the soda, it is very difficult to keep them bright and polished.

MEDICAL VS. TECHNICAL TRAINING IN DENTAL EDUCATION.

BY ALTON HOWARD THOMPSON, D.D.S., TOPEKA, KANSAS.

(Read before the Alumni Association of the Dental Department of the University of Tennessee, at Nashville, Tenn., March 28, 1901.)

THE symposium upon the subject of dental education before the Section of Stomatology of the American Medical Association, June, 1900 (DENTAL COSMOS, 1900, page 784), may be taken as a fairly representative presentation of the views of those who hold that the dentist should be educated as a medical specialist, like the oculist and aurist, and that there should be but one degree for all branches of the medical family. The papers composing the symposium were all in favor of the claim that the dentist should have more of a medical education, and that he should be, first of all, a medical man.

The founders of American dentistry wished dental education to be taken under the wing of the medical colleges by the establishment therein of special chairs for the instruction of dental students in the special dental branches, the general branches to be taken in common with the medical students. The refusal of the medical colleges to accede to the prayers of Chapin A. Harris and his noble *confrères* obliged them to establish the first independent dental college in Baltimore, and this was followed by the later organization of similar colleges in other cities for the instruction of dental students; and thus it was that we became separated at this early stage from the medical profession. With the establishment of the first independent dental college Dr. A. E. Baldwin held (in his symposium paper) that the narrowing of the dental profession began. He then proceeds to quote from various journals and society reports, showing the ignorance of some dentists of to-day

in regard to some medical principles. The selections are hardly fair, however, as they are designedly chosen for their ignorance, and are not representative of the average intelligence of the dental profession upon medical subjects. The strictures made upon the whole profession are therefore unjust, and cannot by any means be taken as the "handwriting upon the wall," as he styles it. We cannot believe that all dentists are incompetent, as dentists, who are not medical men.

Dr. Jno. S. Marshall thought that too much time is being given to mechanical and technical training, and not enough to scientific instruction along medical lines in dental education. He thought that dental students, instead of being scientific practitioners, are becoming mere mechanics and artisans. He admits, however, that "manipulative skill of the very highest order is required in the first-class dental surgeon." We agree with him, of course, that the dental student should be well grounded in the medical fundamentals; no one would think of denying that. The question at issue is, *How far should the dental student be taken beyond a good knowledge of the fundamentals?* Dr. Marshall said further, "Our young men should be encouraged to take a thorough course of instruction in medicine and surgery before entering upon the technical training of the dental college course," for he believes that this is the only way in which a truly scientific dental surgeon can be made. With this proposition we must disagree. A thorough course in medicine would take the dental student into fields of general and special disease with which he can never have anything to do, and the study of which is consequently a waste of time, means, and energy, and will result in a premature exhaustion of his youthful powers. Having devoted the first golden years of youth to pursuits which are of little or no value to him, he then brings a jaded mind and unused hands to the acquisition of technical ability. It becomes doubly hard for the student to take up manual training and technical practice after years spent in the routine of the closet and the lecture-room. In fact, if he does not have manual training during his first years of preparation, it will be almost impossible for him to acquire that manual dexterity which is absolutely essential to the successful dentist. That this has been demonstrated in many instances of medical graduates who have entered on the dental course after years spent in medical colleges is within the knowledge of all teachers. If, as Dr. Marshall claims, the medical graduate should be permitted to enter the senior class of the dental course and try to learn the technique and acquire the skill necessary for dental practice in one year, he would fail miserably in the attempt. It is a fallacy also to say that "superior technical skill may be attained after graduation, as the very nature of the everyday occupation of the dentist tends to perfect him in manipulative technique." Dr. Marshall must have been suffering from an attack of medical myopia as regards the dental profession and its requirements when these lines were penned. We agree with him that "if dentistry is a learned profession and separate from medicine, it should place itself upon the same plane as the other learned professions,"—but along its own lines, as it is a separate profession.

Dr. R. R. Andrews believes that dentistry is a specialty of medicine, and should be placed on the same plane as the oculist, aurist, and dermatologist, and that there should be but one degree for all, the time-honored M.D. But Dr. Andrews and the medical party do not recognize the fact that there is a very great difference between dentistry and the proper medical specialties. They are mainly medical and surgical, and dentistry is mainly mechanical in its practice. This fact constitutes a difference that is fundamental. We agree with Dr. Andrews that the dentist, like the lawyer, physician, and clergyman, should have a degree in letters before starting on his professional training. He is a professional man, and meets professional and college people in his walks in life, and should therefore be their equal in culture. Dr. Andrews thinks that "the mental training of the medical course would be of value to the dental student," but we think that that training could be obtained to better advantage in the humanities. He says, "It has been urged that we are likely to lose our manual skill attending to studies so largely theoretical, but do we forget how much practical work is required for the degree in medicine? In physiology, in chemistry, and physics, and at the dissecting table we gain a very large amount of manual skill." Here is a case of medical myopia again. The laboratory work of the medical branches does not begin to furnish exact technical training like the varied work of the dental laboratory, which experience has demonstrated is necessary for the development of that practical skill that is most essential in the daily life of the dentist. We agree that "the demand of the time is for a higher standard. The salvation of our profession is to be achieved through educational attainment." We do *not* agree that "in the highest sense dentistry is a specialty of medicine, and that more time should be given in our special training to *abstruse problems* in medicine whose actions have *remote influences* upon the mouth and its diseases." We emphasize the "abstruse problems" which have a "*remote influence*" upon the mouth, etc. That is the part we object to; that the dental student should be called upon to expend time and energy upon those "abstruse problems" that have only a "remote influence," and, we might add, some that have none at all. We rise to state that we think that his time could be better employed in preparing for the business of practice, the things that he will be called upon to do every day in the year. "Abstruse problems which have remote influences" should be relegated to the domain of external special studies to be pursued as side issues.

Dr. Alice M. Steeves thinks that the dentist should be a medical specialist, like other medical specialists, to the end of more "completeness of education." We agree again that the dentist should have "a knowledge of the structure and functions of organs not only of the mouth, but of the whole organism, and of the principles of disease as well." Very good,—with the "*principles of disease as well.*" All that is true enough *if* not carried too far,—*i.e.*, to the extent of the whole gamut of general and special diseases with which the dentist has little or nothing to do in his special work.

Dr. W. A. Evans stated that "the average dental course is better than the average medical course, and that for the average dental student a good dental course is better than the best medical course for the average medical student." This admits to a degree the position that we assume,—i.e., that the *special dental course is good for what it is intended to do*. He also well states that "the present demand is for a dentist who can meet the ordinary questions that arise in the course of dental practice, without any special reference to the more abstruse and remote problems." The dentist of the future should, he wisely says, be made a broader man. In this we all agree. He says, "We must ever broaden, but we must always remember that the object of it all is to make a dentist, a growing, developing dentist, but *always* a dentist." To this we say Amen! Let us make of him a dentist, but not a physician.

Dr. N. S. Davis said that "no man can do full justice practically to the most limited specialty without a thorough knowledge of the five branches of medicine that are fundamental." In this we all agree. But that "all specialists should pass the same examining boards, be designated by the same title, M.D.," and to establish "in every medical faculty a professor of dental and oral pathology and practice, on the same basis that you have a professor of ophthalmology, neurology, or gynecology," with this we disagree, for the reason that the field of dentistry outside of the distinctly medical branches is very much wider than that of any of the medical specialties, and that its practice is not strictly medical or surgical, as the medical specialties are. Dental practice is so much more technical and mechanical that it does not compare with the strictly medical specialties. If we develop and extend the medical branches in our curriculum, we do it at the expense of that technical training upon which the success of dental practice depends. It is the weakness of the medical idea to disparage technical training, and their theory would result in the inevitable lowering of that high standard of practical ability to which we have attained.

Dr. A. H. Peck well argues in his paper that "one of the most important questions to be considered is just how far should we as teachers of dental students carry them in the great field of *materia medica* and therapeutics," and that is *the* all-important question in regard to *all* of the medical branches,—i.e., just how far should we go? Dr. Peck thinks that in his field it should be carried to the extent of being "able to recognize and intelligently prescribe for the various systemic disorders that are constantly aggravating the local pathological manifestations, and not merely to be able to treat locally the pathological manifestations of the mouth reasonably well." Our verdict would be to give the dental student sufficient instruction to enable him to treat *thoroughly well* the local pathological conditions, and then send the patient to the general practitioner for systemic treatment. Indeed, we have no professional or ethical right to intrude upon the domain of the general practitioner by prescribing for general disorders. We would raise the ethical question right here. We are quick to resent the interference of the general physician when he intrudes upon *our* field. How, then, can

we claim the ethical right to practice in *his* field, even if we have the coveted M.D.? As specialists it is unethical to intrude upon the field of another. Dr. Peck well says that "we favor first the teaching of those drugs with which the student will come into daily contact in his practice . . . and, second, a thorough knowledge of at least the standard remedies." But beyond that he has no interest, for in practice he would be unwarrantably officious in prescribing for general disorders.

Dr. W. B. Hill says truly that there is not as much sympathy between the physician and the dentist as there should be, but the remedy is not that each should know the field of the other with expert knowledge. He says that "the oral cavity has been abandoned by the physician to the dentist," which is perfectly right; and, by way of fair ethical exchange, the general system should be abandoned by the dentist to the physician. He says, further, that "the patient is referred to the dentist with the expectation that he will assume the full responsibility of the care of the mouth," which, in our opinion, is a right and proper understanding of the ethical relations of the physician and dentist. We cannot believe that "in the present conditions of practice a large percentage of diseases of oral origin go unrecognized by dentist and physician alike." This is another case of medical myopia. We do not believe that "humanity suffers from the maladjustment of medical and dental education." We agree that "intelligent consultation of the physician and dentist" is most desirable, and readily obtains even in these evil days. Each in his field is acknowledged as an expert, and is deferred to by the other, but his action is confined to his own field, ethically and properly. Nothing could be more honorable and satisfactory to both parties. They do not need "the common ground upon which to stand,—medical education." Let the relation stand as it is, each supreme in his own field, and not presuming to meddle with the other's rightful domain.

Dr. E. S. Talbot says that "in dealing with limitations in dental education we are brought face to face with the greatest evil,—divorcement of dental from medical teaching. . . . The result is that study of the general diseases that affect the mouth, jaws, and teeth have been neglected. Limitations of a dental education have prevented the dentist from associating local diseases with systemic causes. . . . This has resulted in great mental limitations to the dentist. Only a medical education can remove these mental limitations." Medical myopia again. We are far from believing that connection with the medical profession will cure all the evils in dental education. If "dental college teaching is in a rut," so is medical college teaching, and we will go further and say that the medical educational rut is deeper than the dental.

Dr. G. V. I. Brown says truly that "the colleges that have been conducted independently of medical colleges point with pride to the record of their achievements," and it is also quite true that "it may be possible that in the evolution of the educational system of the profession that the time has come for something better." We do not agree with him that the "broadening should be in the direc-

tion of medical demands." The public is demanding more of dentists, it is true, but those demands are rather in the direction of higher technical skill, and not for medical specialization and systemic treatment at his hands. In that Dr. Brown is mistaken. He says further, and quite truly, that "the plan of having a four years' course precede the study of dental branches is impracticable; the age of the student, after allowing for the necessary years of preliminary study, would in most instances be such as to render the matter of manual training and the acquirement of sufficient technical dexterity very difficult and uncertain. Whereas, on the other hand, the more matured mind is better able to understand the science of medicine. . . . There is no good reason why the study of medicine during the first two years cannot be supplemented by thorough training in operative and prosthetic technics. . . . It is not generally recognized that the mental and physical requirements of the practitioner of dentistry cover a wide field,"—even more so than the medical specialties. We do not believe that the salvation of the profession depends upon the "restoration to medicine unconditionally of her wayward but promising child, dentistry."

An excellent article is that by Dr. E. Lloyd Williams upon "The Teaching of Dental Mechanics in Dental Schools," read before the International Dental Congress of 1900 at Paris (DENTAL COSMOS, 1900, page 1275). It is in marked contrast to the opinions of the contributors to the medical symposium. Dr. Williams thinks that technics receive too little attention, and says truthfully that "an important factor in dental education, and one which has possibly not received the attention that it deserves, is a thorough training in dental mechanics. The practice of modern dentistry demands, perhaps to a larger degree than that of any other branch of surgery, a nicety of manual dexterity, exacting both in precision and nervous strain." He asks the pertinent question, "Is this subject being taught scientifically in the schools? I know pretty accurately the scope of work in the schools of Great Britain, and have a slight knowledge of the principal schools of the United States, and, so far as these countries are concerned, I say unhesitatingly that the subject of dental mechanics is a miserable *starveling of the curriculum*" (*italics mine*). That is pretty strong talk for one who knows. He says, "I must earnestly appeal to those who control dental education and ask, Can nothing be done to make us realize our responsibility in the matter? I would urge that two full years, of ten months each, is the minimum time which should be spent in acquiring a practical familiarity with dental mechanics, and that the teaching should be comprehensive, scientific, and thoroughly practical." He then gives valuable details as to how dental mechanics should be taught.

Dr. B. Holly Smith, in his most excellent presidential address before the National Dental Association last year, speaks instructively of the important matter of manual training for the dentist. That those entering the profession should have trained hands there is no denying. He says (DENTAL COSMOS, 1900, page 899), "In

an experience of twenty years as a dental educator it has often been a source of mortification to me that so many of the men who have had the advantage of extended so-called mental training made the most impossible of material out of which to make dentists. The fault was in the character of the training. The motor centers had been neglected. Among the best all-around men whom I have helped in professional life, men of skill and judgment, have been watchmakers and men who have served apprenticeship in machine shops, gaining a practical knowledge of metals and considerable manual dexterity in their management. Our educational system has not yet awakened to the necessity for this kind of training. Our profession does not advocate it as it should. . . . Beyond the positive loss resulting to the individual and to the world from untrained or imperfectly trained motor areas,—measured we may say by dreary and expressionless blanks in positive accumulations of knowledge, experience, and power,—comes the most important function of the development of these areas in their formative influence upon the development of the mental character as a whole. . . . The general educational value of motor training is incontestable. Such training tends to develop and strengthen the mental equipment of the individual, for it is through this training that the will, the judgment, and the memory are strengthened and developed. Another consideration of importance arises from the peculiar benefits accruing to our profession from their fullest and most perfect cultivation, for the essential fact of the training of the capacities and powers which we may call specific and technical is to us all-important. This training should be a most important factor of preliminary education, because it is at the time of life when the formative period has not yet passed that we may expect the motor ideas to become integral and generative. It is at this period that the unconscious and subtle power must be acquired which will afterward flower into the consummate mastery of technique and manual skill." Surely the cause and claims of manual training could not be presented in more elegant language, nor with more logical argument. No one can deny the value, nay, the *necessity*, of manual training to the end of producing efficient and skillful dental operators. Indeed, if there is one thing that the dentist of the future will need more than anything else, it is greater manual dexterity. In this, the day of the expert in every department of life, he must be trained to the very highest degree of efficiency, that he may be able to hold his own in the battle of life.

It is well known to every college demonstrator that the moment the student comes into the infirmary to operate on patients, that unless he has had clinical training or private practice he is most discouragingly clumsy and ignorant of the simplest procedures. He needs clinical opportunities and instruction as soon as possible after entering college. As Dr. Williams well said (*op. cit.*), "No pupilage can be complete unless ample opportunities are offered to the student of testing at the chair-side his efficiency in practical work. The plaster model and the living oral tissues are neither synonymous terms nor identical quantities, and the student finds

that dealing with the patient is lucid anatomy, and adds distinctly to his interest in his work." Dr. W. A. Evans (in the medical symposium, *op. cit.*) made a good suggestion along this line,—*i.e.*, "It seems desirable to put the student in the infirmary in the beginning of his work. A proper plan would be to assign each first-year student to a third-year man, to serve him in the capacity of an assistant. He would watch the senior, wait on him, dry cavities, hold the mouth, etc. The advantages of this arrangement would be mutual and two-fold,"—as is at once apparent. A prominent educator (Professor S. H. Guilford, *Stomatologist*, October, 1900) also says along this line, concerning his own work, that "the teaching of operative dentistry will be carried on along practical lines. The didactic teaching will be supplemented by practical demonstrations covering the whole range of operative procedure. In this way the student will be both taught and shown the many minute details which go to make up the complete operation. . . . Cavity formation will be begun the first year, and carried through the second,—first on large models, then on smaller, then on teeth as nearly as possible as in the mouth, etc. In this way the difficulties will be gradually increased, and the skill of the student correspondingly developed. . . . With such preliminary training, when he comes to operate on the patient he will know what to do and how to do it. . . . By proper and prolonged manipulative training during his earlier college years he will be made more competent and self-reliant in his last year's work, and will leave college better qualified to serve his patients properly." These excellent words state the problem very clearly, and carry weight as coming from an experienced educator who realizes the weakness of the present system.

The demand of the day is for work, and for educated work. And it is likewise true that all the forces, the potencies of our day, are passing into the hands of the educated men and women, the trained men. As President H. S. Pritchett said before the Massachusetts Institute of Technology (*Science*, 1900, page 659), "It is of the first importance to inquire whether the man who is coming into this power is worthy of it, and whether the training he has received in the college or the technical school is given with any purpose of fitting him for this trust. . . . Macaulay's motto was, 'The first business of the state is the education of its citizens.' We stop to inquire, Are we then, as a branch of the great scheme of national education, doing our full duty in the best manner possible? He continues, "One of the lessons which exact technical science leaves with the student is the necessity not only for exact work, but for a high ideal. Science is satisfied with nothing short of perfection, and this spirit pervades the whole body of its votaries. In education it is not sufficient to be merely accurate, but it is necessary to hold fast to the highest ideals. . . . This is the day of the trained man, and to him the responsibilities and the rewards will go."

We as a profession are engaged in a technical calling in our application of science to the needs of man. Technical education is

entirely a growth of the nineteenth century, and especially of its latter half. In all branches of the applied sciences this is manifestly apparent, and all of the marvelous advances of the century in material prosperity have been due to the development of technical skill in the application of scientific knowledge. We cannot afford to lag behind in the progress of technical training, but must keep pace with the onward march; and to that end must advance our standards. Indirectly, the training of expert operators will prepare the way for those superior geniuses who will both augment our usefulness and contribute to our development in every direction.

NOTES ON NERVOCIDIN.

BY THEODORE SÖDERBERG, D.D.S., SYDNEY, N. S. W.

WHEN I, some time back, received, through the kindness of Professor Arkövy and Dr. Dalena, a small quantity of *nervocidin*, and at once commenced clinical experiments with the drug, I felt a blissful certainty of success overshadow my first trial,—so unlike the usual mental state of unrest which accompanies a dentist's first experiments with the dozens of new drugs recommended for this or that.

As tabulated statistics of clinical experiments with *nervocidin*, undertaken at the Zahnärztlichen Universitäts-Klinik in Budapest, have already been published in the *Vierteljahrsschrift für Zahnheilkunde* (October, 1900), I shall limit my contribution to a few general remarks (purely empirical) on my clinical experience with the drug.

The remarkably quick action of *nervocidin* is perhaps the first point observed. In many cases of exposure, the pulp can be painlessly extirpated after a few hours' application of the drug. The next point observed is that *nervocidin* has not the deeply penetrating quality of arsenic. In most cases of non-exposure, two applications are required to sufficiently anesthetize the pulp prior to extirpation, the first application being for the painless exposure of the pulp, the second for its removal. Another point soon noted is the long duration of the analgesic effect of *nervocidin*.

Nervocidin, not being a caustic or an escharotic, acts on the pulp in a totally different way to arsenic. Arsenic devitalizes, *nervocidin* anesthetizes or paralyzes the tissues. Clinical proofs: Seal an arsenic dressing for twenty-four hours over a freshly exposed pulp; result, devitalization beyond resurrection. Seal a *nervocidin* dressing similarly; result, *apparent* death or partial death of pulp. Remove dressing and all traces of *nervocidin*; seal a eugenol dressing over exposure for a week; result, pulp highly sensitive. Again, seal an arsenic dressing forty-eight hours in the shallow, hypersensitive buccal cavity of a lower molar; result, (1) death of the contents of tubuli, with (probable) ultimate death of pulp; (2) sloughing on cheek in contact with the seal. Seal *nervocidin* similarly; result, hypersensitiveness gone and no sloughing on

cheek. Now excavate freely, and fill cavity for a week with a zinc oxid-eugenol filling; result, return of sensitiveness of dentin.

Until otherwise convinced, my opinion is that nervocidin acts paralytically on the nerve-fibrils.

Can, then, nervocidin be fearlessly used as an obtundent for sensitive dentin? Beware of nettles! Perhaps it can, and perhaps it cannot; time alone can answer that question. All I can add to the above opinion is the advice to those practitioners who dare the experiment to carefully choose their test patients, and then proceed as follows: Mix oxysulfate (or oxyphosphate) to medium thickness, and incorporate with it a small quantity of nervocidin. Dry the sensitive cavity with bibulous paper, and insert the filling. From two to forty-eight hours after (according to experiment) remove cement, excavate, and fill permanently. *Watch that tooth!*

Does pain follow after the application of nervocidin? My experience so far is that some pain generally follows the application in cases of acute pulpitis, but the pain is not nearly so constant and severe as that felt after the immediate application of arsenic in similar cases. Where acute pulpitis is absent, pain does not as a rule follow. In two cases I found, however, tenderness to occlusion after the fourth day,—why, I cannot explain satisfactorily, as nervocidin, unlike arsenic, does not cause hyperemia of the pulp, and does not appear to be a sufficiently strong irritant poison to produce a toxic periodontitis similar to that often produced by arsenic after its retention in the cavity longer than forty-eight hours. After fully exposing the pulps in these two cases (both upper third molars), I found the color to be a light pink, and no trace of septic infiltration present; hence neither hyperemia nor gas-formation could account for the tenderness. Nor did the seal interfere with proper occlusion.

As nervocidin does not cause hyperemia of the pulp, its use for the anterior teeth should be indicated in preference to arsenic, with its concomitant discoloration of those teeth.

In all cases of pulp-extirpation or amputation where the decay extends beyond the gum-margin, or where the seal comes in contact with the oral tissues, nervocidin must in the future be substituted for arsenic. This statement I consider unassailable. The relative value of the two drugs in all other cases of devitalization, extirpation, or amputation of pulps is open to discussion. I personally give the preference to nervocidin in ninety per cent. of all cases.

The sticky nature of nervocidin when moist renders it difficult to place in position per medium of absorbent materials, such as cotton-wool or spunk. A non-absorbent medium should be used, the under surface of which is moistened just sufficiently to take up the quantity of nervocidin, the dry upper surface being gripped by the pliers. It is preferable to have the cavity as dry as circumstances will allow, thus allowing a more reliable seal to be made.

Generally speaking, my experiments with nervocidin confirm the correctness of most of Professor Arkövy's clinical conclusions.

I venture the opinion that the introduction of nervocidin is one of the greatest events in modern dental pharmacology.

NEURECTOMY FOR TIC DOULOUREUX: WITH REPORT OF FIVE CASES AND EXHIBITION OF SPECIMENS REMOVED.

BY W. J. ROE, M.D., D.D.S., PHILADELPHIA, PA.

(Read before the Pennsylvania State Dental Society at Ligonier, July 9, 1901.)

THIS contribution being restricted to the surgical treatment by neurectomy of tic douloureux, calls for a clear understanding of the term "tic douloureux." Facial, trifacial or trigeminal neuralgia are not necessarily synonymous with tic douloureux, as is so frequently stated, but its strictly literal meaning and application, as originally employed by the French, was to designate a form of neuralgia of the fifth nerve associated with convulsive or epileptiform contraction of the regional muscles. It is therefore distinguished from the other form of neuralgia by its characteristic contraction of the associated muscles, by more severe paroxysms, and by its invariable intractability to local and constitutional measures (other than surgical interference) which so frequently give relief in the other and less severe form.

Even though desirable, neither our time nor the subject of this paper will admit of including the etiology, pathology, symptomatology, diagnosis, and medical treatment of neuralgia in its simpler form, or even of the other and more severe type under consideration.

When a case presents, the following questions have to be decided: 1. Is surgical interference justifiable, and when should it be employed? 2. What operation or method best serves the purpose?

The suffering is so intense and the incident dangers so great that it seems surprising that so many patients are allowed by their attending physicians to suffer, or personally refuse operation for months and even years.

Unfortunately, many patients are not only the subjects of tic douloureux, but are fast in the clutches of opium, which in these cases sooner or later becomes an absolute necessity. If it be withheld, the intense suffering so certainly disturbs the functions of the body and deprives the patient of necessary rest and sleep that exhaustion and death ensue. In one case which I observed, in which morphin was withheld and the patient would not consent to surgical interference, through the intensity of the pain she became insane, was committed to an asylum, and died a few months later.

I do most certainly advocate withholding opium. Surely surgical intervention is preferable to its administration, as, when once given, relief being only temporary, and the demand and necessity continuing and increasing, the drug too frequently hinders the patient from deciding upon the surgical treatment and retards recovery when that treatment is instituted. In my opinion, there are few, if any, cases in which surgical interference is not justifiable.

In many cases, being the outcome of a milder form, it must necessarily have existed for some time. Already much valuable time has been lost, the patient's strength and fortitude greatly lessened, and in many cases every means, both local and internal, have been carefully employed, incurring great expense.

If the paroxysms of pain are of moderate severity and not so frequent as to seriously interfere with the patient's health, there is at present one form of medical treatment which, if not already given, should be faithfully tried. I refer to the treatment instituted by Dana (1),* by the administration of strychnin in rapidly increasing doses, combined with absolute rest. This treatment has gained pre-eminence during the past few years, as relief, either partial or complete, has been obtained by it in not a few cases. If the pain is very severe, and no appreciable benefit is derived from Dana's treatment at the end of one month, why should we wait? Why not choose the measures which offer certain relief in preference to those offering only possible relief? In cases in which the administration of opium has just been begun, to wait at all entails the dangers of establishing the opium habit, and, if the necessity for opium continues, I would certainly operate; if not at once, at the end of one month's treatment. Where the opium habit is well established and large doses are being taken, it is scarcely possible to reduce the daily quantity of opium or to withdraw it until the pain is relieved by surgical treatment.

An argument of equal, if not greater, importance is well made by Keen (2) in favor of early operation, to prevent the involvement of deeper portions of the nerve: "My own conviction, based on examinations so far made, is that the disease, in many cases at least, is primarily peripheral, and that the ganglion is involved by extension upward." In view of this, he advises operation in all cases in which the disease has lasted three or four months and not responded to medical treatment. He believes that if earlier surgical measures could be instituted, the necessity for the more severe and dangerous operation of excision of the ganglion could be averted. My own observations lead me to concur with the above.

In regard to the mode of operation, the following conditions must necessarily be considered: safety, results, and expediency. The mortality incident to extracranial neurectomy, performed upon the distribution of the fifth nerve, is not greater than results from general minor surgery, which, under modern methods, is almost *nil*. This, compared with the mortality of intracranial neurectomy (as reported by Tiffany (3) in 108 cases, 22.2 per cent.), decides the question of safety, which is universally recognized.

The desired results, in any case, are total and permanent relief from pain, the preservation of associated functions, and the minimum amount of deformity. Reports at present are much at variance as regards the results of intracranial and extracranial operations.

The number of cases in which total and permanent relief followed extracranial neurectomy, since it was first introduced by Abernethy (4) in 1793 up to the present time, has, unfortunately, been exceeded by the number of recurrences, the proportion varying according to the operator and the method employed. Practically all the cases were temporarily relieved, and these facts seemed in evidence: That the duration of relief was in proportion to the

*See appended bibliography.

amount of nerve removed, and permanent relief most frequently followed excision of the greatest amount; and that in those cases in which pain recurred and a subsequent operation was performed the proximal and distal ends were found to have united, and in many cases showed little or no evidence of the previous operation.

To give a comprehensive idea of the vast amount of work done in this field of surgery is quite impossible with my limited time, but I wish to briefly attempt a classification of the methods employed and refer to a few of the more important operations, to enable us to determine which mode of surgical procedure best secures the desired results hereinbefore noted.

Neurotomy of the fifth nerve (introduced by Schlichting (5) and Marichal (6) in 1792) by subcutaneous and submucous incision, or through an open one, was done upon the terminal distribution of the three divisions at their exit from the supraorbital, infraorbital, and mental foramina, or in the course of the trunk of the nerves in the orbital cavity in the infraorbital groove, and before reaching the inferior dental foramen at the spine of Spix. In the latter case the nerve was reached by three routes,—through an incision just behind the posterior border of the ramus, retro-maxillary; by a trephine opening through the ramus, trans-maxillary; by an incision through the mucous membrane from within the mouth, intra-buccal.

Neurotomy has been practically abandoned in later years, but served a useful purpose, as it afforded temporary relief and demonstrated that the pain originated in the peripheral portion of the nerve involved. It is still a useful procedure in cases where it is desirable to postpone the more severe operation of neurectomy owing to some complication.

Incidentally, although somewhat arbitrarily, many surgeons have divided operations for extracranial neurectomy into two classes,—superficial and deep. The superficial operations are performed upon the nerves as they lie in relation to or pass through the frontal and maxillary bones. The deep operations are performed upon the second and third divisions, as they pass from their foramina of exit in the skull to the maxillary bones.

Neurectomy of the ophthalmic division is done through a straight or curvilinear incision of about one inch in length, the center of which is over the supraorbital notch or foramen. The contents of the orbit are retracted downward, and both the supraorbital and the supratrochlear nerves can be removed. In rare cases the lacrymal and nasal branches are involved, and they can be removed through similar incisions.

Neurectomy of the superior maxillary division is performed through a straight or curvilinear incision one and one-half inches in length, the center of which is opposite to the infraorbital foramen, exposing the infraorbital nerve as it emerges from the foramen beneath the levator labii superioris, and, after lifting up the contents of the orbit (Wagner) with a spatula, the nerve is lifted out of the infraorbital groove and resected as far back in the orbit as possible, or at its entrance. Then it is drawn through the infraorbital canal.

Some operators prefer removing the roof of the canal with chisel and forceps.

The frequent recurrence of pain following this operation led Carnochan (7) in 1855 to institute his bold, but perfectly justifiable, antral method for removal of the superficial and deep portions; Braun having suggested removing the infraorbital nerve from the foramen rotundum to the infraorbital. After exposing the outer wall of the antrum, and the nerve at the infraorbital foramen, by means of a Y-shaped incision, he made a three-quarter-inch trephine opening just beneath and involving the infraorbital foramen, and a one-half-inch trephine opening in the posterior wall of the antrum. He next removed the floor of the infraorbital canal and groove, enabling him to draw the nerve into the wound and to follow it through the spheno-maxillary fossa to the foramen rotundum, where he excised it, including Meckel's ganglion. In two of his first three cases he removed two inches of the nerve, and one and three-quarters inches in the third, including Meckel's ganglion, the removal of which he considered very important.

Horsley (8) was able to remove the nerve at the foramen rotundum without tunneling the antrum (as done by Carnochan, Chavasse (9), and others) by enlarging the spheno-maxillary fissure by means of bone-forceps. Both superficial and deep methods are combined in the above.

Von Langenbeck's (10) operation of temporary excision of the maxilla for the removal of naso-pharyngeal tumors was performed by Gerster for neurectomy of the second division. Having assisted Mears in this operation for the removal of a large sarcoma from the naso-pharyngeal vault, I consider it the most heroic method as yet performed for extracranial neurectomy of the second division.

The results of neurectomy of the second division, with or without removal of Meckel's ganglion, as given in Fowler's (11) report of eighty-three cases, are as follows:

Of 26 with removal—

Relief was obtained in	3	cases in	over three years.
" " " "	6	" "	from two to three years.
" " " "	9	" "	from one to two years.
" " " "	8	" "	under one year.

Of 26 without removal—

Relief was obtained in	5	cases in	over three years.
" " " "	3	" "	from two to three years.
" " " "	7	" "	from one to two years.
" " " "	11	" "	under one year.

Average: When removed—1 year 5 months 16 days. When not removed—1 year 3 months 15 days.

Gross (12) says, "I have myself repeatedly performed Carnochan's operation with immediate and permanent relief, but in no instance have I been compelled to carry the division up as high as the ganglion of Meckel."

Neurectomy of the mandibular division is most frequently accomplished through a two-inch incision, beginning a little posterior to the angle of the mandible and carried forward just beneath the lower border of the body. This incision divides the facial

artery and vein, but does not involve the branches of the facial nerve, and is well hidden beneath the body of the mandible. The muscles on the outer surface of the body and mandible are detached and are retracted upward, and the nerve can be exposed by means of a trephine opening opposite the inferior dental foramen, or at any point in the canal by extending the incision if necessary.

Many operators, not satisfied with removing a half-inch or more of the nerve through the trephine opening, have excised that portion of the nerve which passes through the canal by removing its entire outer wall or roof from the inferior dental to the mental foramen.

Recurrences in many of these cases made it desirable to reach the deeper portion of this nerve, and for this many methods were devised.

The trans-maxillary operation, originally proposed independently by Horsley and Cryer, consists in exposing the upper portion of the ramus through a vertical incision and finding the sigmoid notch, and with a small trephine extending it downward as far as the inferior dental foramen. The nerve can then be isolated from the surrounding structures back to the foramen ovale, and there excised. The lingual branch can also be secured through this incision.

Lucke and Sonnenburg introduced the retro-maxillary operation. They reached the nerve through a vertical incision a little behind the posterior border of the ramus, separating the upper portion of the internal pterygoid muscle until the spine of Spix is reached and the nerve secured and drawn into the wound, when it can be traced back to the foramen ovale and excised.

Lizars suggested and Meckel performed in 1856 the intra-buccal method of incising the mucous membrane along the anterior border of the internal pterygoid and finding the spine of Spix and the nerve, which was then drawn into the wound and excised.

In many cases, both the superior and inferior maxillary divisions are involved alike, and to meet this difficulty it was found desirable to excise the deeper portions of both nerves.

Joseph Pancoast (13) devised and performed the following operation successfully in four cases: He exposed the outer surface of the ramus through a rectangular flap, the base of which was just beneath the zygoma, after which he resected the coronoid process at its base and removed it, after detaching the temporal muscle. He next ligated the internal maxillary artery, after which he detached the external pterygoid muscle from its origin. After clearing out any remaining fat, he exposed both the second and third divisions at their respective foramina, and these were then caught up upon a blunt hook and excised.

Lucke (14) reached the second division through an oval incision, detaching the masseter muscle from the zygoma, which he resected and retracted upward and exposed the nerves in front of the temporal muscle.

Braun (15) and Lossen (16) reached the nerve by detaching the temporal fascia from the zygoma, which they then resected and retracted downward with the masseter muscle.

Salzer (17), Kronlein (18), and Mixter (19) have operated by modified method, turning down a flap from the temporal fossa, which included the temporal muscle, whose base was the zygoma. The zygoma was then resected, the external pterygoid muscle was detached, and the nerve exposed. Before resecting the zygoma in these cases, suture holes were drilled, allowing it to be replaced and sutured.

Ullman (20), Mikulicz, and Obalinski divided the mandible at the angle, or just back of the third molar tooth; and by retracting the vertical ramus outward, making a funnel-shaped space, and detaching the internal pterygoid from the ramus, they were able to reach the nerve.

Under each of the above and all similar methods regeneration of the nerve, with recurrence of pain, took place in the majority of cases. In view of this, Mears (21) in 1884 first proposed removal of the Gasserian ganglion. Rose (22), in an extensive review of this subject, says recurrence was more the rule than the exception, and this led him in 1890 to do his first neurectomy of the Gasserian ganglion, in the case of a lady upon whom he had in the previous two years performed two extracranial neurectomies, followed by temporary relief. The pain, upon second recurrence, was so severe that the patient had no desire to survive the operation unless she were relieved.

Many ingenious devices were employed to prevent the regeneration of the nerve, with its inevitable recurrence of pain. Klein, in 1822, crushed and cauterized the central end; Boyer cauterized the peripheral end. Others divided it with galvano-cautery. Malgaigne split one or both ends and turned them back in the form of a loop. Keen (23) has plugged the canal with Horsley's antiseptic wax, and quite recently the button of bone removed in trephining over the inferior dental branch has been replaced and turned horizontally, so as to obstruct the canal, and flaps of soft tissues have also been placed between the ends. These measures all have failed in the majority of cases.

The preservation of associated functions and the minimum amount of deformity, although scarcely to be considered in the attempt to obtain permanent relief from pain, are unquestionably of very considerable importance to the patient. Any method requiring the detachment of the masseter, temporal, or pterygoid muscles results in retraction, atrophy, and greatly diminished functional power. An incision which involves branches of the facial nerve results in corresponding paralysis of the muscles of expression.

The resection or excision of the zygoma or of the coronoid process almost invariably results in a degree of ankylosis of the temporo-maxillary articulation. Resection of the mandible at the angle not unusually results in fibrous union. Neurectomy of the motor branches of the third division causes paralysis of the muscles of mastication. Ligation of the common or external carotid arteries, or branches of the latter, leads to a degree of atrophy.

The deformity is in proportion to the length and exposed site of the incision, the amount of retraction and atrophy of the muscles,

and the lack of functioning power of the same and the disarrangement or loss of bone structure.

Since Rose (24) led the way for surgeons to reach and excise the Gasserian ganglion, more than two hundred similar operations have been performed. Different methods have been employed, many of the earlier operators following Rose's pterygoid route, the first part of which was practically the same as the Lucke method for reaching the foramen ovale, at the site of which he trephined the skull, exposing the ganglion, which he then removed.

This method fell into disuse when the Hartley (25)-Krause (26) method was introduced. The latter consisted in making a horse-shoe incision in the temporal fossa, the base corresponding to the zygoma, including skin, temporal fascia and muscle, and an osteoplastic resection of the corresponding portion of the skull. The ganglion was reached by elevating the dura and brain.

The Hartley-Krause method may be called the high temporal route, in contrast to the low temporal route of Cushing (27). In Cushing's operation the incision is similar to that made in the Hartley-Krause method, except that the zygoma is resected and the temporal muscle is detached from the temporal fossa, exposing the great wing of the sphenoid, through which a small opening is made with a gouge and afterward enlarged with the Rongeur forceps, exposing the dura and the middle meningeal artery, which are then elevated so as to expose the ganglion. The advantages claimed by this method over the previous one are—(a) The meningeal artery is not injured, while it is frequently wounded in making the osteoplastic resection or torn at the foramen spinosum while elevating the dura. (b) The exposure of the ganglion is accomplished with little elevation of the dura and brain, whereas in the high temporal method considerable elevation of dura and brain is necessary, and in some cases a sufficient exposure of the ganglion is almost impossible. This therefore gives the maximum amount of exposure with the minimum amount of compression of the brain, and avoids the annoyance and dangers incident to injury of the meningeal artery.

As regards the safety, results, and expediency of intracranial methods, we quote the mortality and results as given by Keen (28): Mortality, twenty per cent. or over; recurrence of pain with original intensity, from one to two per cent., and in a milder form, four to five per cent. This and the associated dangers, such as ulceration of the cornea or loss of the eye, and the invariable paralysis and atrophy of the muscles of mastication, renders the resort to this method a last one.

I have had the opportunity of observing clinically a number of very severe cases, treated by a variety of the above methods; assisting Keen in four excisions of the Gasserian ganglion and Hearn in three operations by Mixter's method (where in each case both the second and third divisions were involved and the deeper portions of each removed), and also in several superficial operations (some of which were for the second and third recurrences).

The extracranial methods being most desirable and expedient,

and the best results having followed the removal of the greatest extent of the superficial and deep portions, and the means to prevent regeneration of the nerve having equally failed, I thought it possible to obtain better results by not only removing the trunk of the nerve from its exit from the skull, but its entire peripheral distribution. By leaving only the central end, I believed that it was quite unlikely that from it alone the nerve would be regenerated throughout its entire extent, and, if not, the pain would probably never recur.

CASE NO. 1. Mr. E. K., Willow Grove, Pa.; age fifty-two. Neurectomy of left inferior dental and lingual nerve. Operation September 22, 1898, for tic douloureux of ten years' duration.

The pain began in a carious tooth (lower molar), which was extracted, followed by no relief. During the first eighteen months he had had extracted at intervals all the teeth in the left half of the mandible. Subsequently, at irregular intervals, he had periods of a few months in which he suffered comparatively little pain in the face, but during these periods he experienced severe attacks of pain in the abdomen, unattended with diarrhea or constipation, which was an interesting feature. During all this time, he had either been under the physician's care or was taking proprietary medicines.

One month prior to operation he came under the care of Dr. C. W. Le Fevre, who administered strychnin, beginning with three-twenty-fifths of a grain daily and increasing until at the sixteenth day he was taking three-eighths of a grain. Then it was discontinued, the pain having slightly increased. Temporary relief was obtained for three days by the local application of a spray of ethyl chlorid, which had to be discontinued on account of dermal irritation. Prior to operation the patient said that the intervals of freedom were not more than a minute in duration, and the attacks began often like the ticking of a watch, but sometimes like the eruption of a sky-rocket. They were less at sundown, but severer during the night if he retired late. Pain was greatly increased by talking or eating, but decreased again after several minutes.

Operation under ether at patient's residence, Dr. Le Fevre assisting: I first made an almost vertical incision one and one-quarter inches long over the middle of the ramus, the upper extremity being just beneath Stenson's duct, involving only the skin. With a dry dissector I split the fascia and fibers of the masseter muscle and the periosteum, retracting the skin, muscle, and periosteum sufficiently to use a three-eighths-inch trephine opposite to the spine of Spix. Upon removing the button of bone, the inferior dental nerve and artery were exposed, and both were included in a silk ligature. After removing with chisel and gouge as much of the outer wall of the canal as I could, through this incision I made an incision of the same length just beneath the mandible and in front of the facial artery. The incision involved the skin only, and with the dry dissector I elevated the periosteum from the lower border of the mandible upward until the outer wall of the canal and the mental nerve and foramen were exposed; and completed the removal of the canal wall with chisel and gouge, lifting the nerve from the canal as I progressed.

In order to follow the nerve back to the foramen ovale, I extended with chisel and trephine the posterior trephine opening into the sigmoid notch, enabling me to separate and excise the inferior dental and lingual branches at the foramen ovale.

Next, instead of again dividing the nerve at the mental foramen, I drew it into the lower incision, and by means of traction and the Allis dissector I was able to tease the terminal branches from the chin, lip, gums, floor of mouth, and tongue. The wounds were next sutured, leaving a small gauze drain in each. The highest temperature recorded after operation was 101; the sutures were removed in one week, and the wound was healed except where the drainage had been introduced (this healing in a few days). In five weeks he had gained twenty-five pounds in weight. He had anesthesia in the region supplied by the left lingual and inferior dental nerves, which did not cause him any inconvenience.

There was a slight limitation in extreme depression of mandible. Neither the facial muscles nor those of mastication were paralyzed nor did any atrophy result, the only deformity being two scars, scarcely more than an inch in length and slightly depressed. He has remained entirely free from pain to the present time.

Specimen removed, 18 centimeters. (See Fig. 1, B.)

CASE No. 2. Mr. J. K., Philadelphia, Pa.; age thirty-four. Neurectomy of right inferior dental nerve. Operation December 6, 1899, for tic douloureux of ten years' duration.

During the first few years he had intervals of weeks and months between the paroxysms, but during the last three years they increased in frequency and severity until he was no longer able to withstand the pain, and threatened self-destruction if not relieved. A few months prior to operation he came under the care of Dr. J. J. Burke, who, in consultation with Dr. Geo. W. Spencer, administered strychnin in increasing doses for a period of six weeks, until full physiological effects were produced, without any appreciable benefit.

(For the privilege of reporting this case in this series I am indebted to the courtesy of Dr. Spencer, whom I assisted to operate.)

Operation under ether, at his residence: We removed the inferior dental nerve from the foramen ovale to its terminal distribution by an operation similar to that described in case No. 1, except that we did not remove the lingual nerve, as it was not involved; nor did we find it necessary to extend the posterior trephine opening quite to the sigmoid notch.

Results in this case were similar to those in case No. 1, and patient has not had any recurrence of pain.

Specimen removed, 18 centimeters. (See Fig. 3, B.)

CASE No. 3. Mrs. G. T., East Liverpool, Ohio; age fifty-nine. Neurectomy of left superior maxillary nerve. Operation August 10, 1900, for tic douloureux of three years' duration.

The patient had received medical treatment for practically all of the three years, but during the last year the paroxysms became more frequent and so severe that she came to Philadelphia to have the nerve removed, being no longer able to withstand the suffering.

She had all her remaining upper teeth extracted in March, 1900, but this gave her no relief. The pain was most severe about the region of the left canine.

Operation under ether in St. Joseph's Hospital: I made a curved incision one and one-quarter inches in length along the lower margin of the orbit, exposing the infraorbital nerve. I again exposed it in the infraorbital groove and traced it back to the apex of the orbit, where I excised it. The nerve was easily drawn through the canal, and by means of traction and the Allis dissector I teased the terminal portion from the eyelid, side of nose, cheek, gums, and lip. The patient had no rise in temperature; went to Atlantic City on the second day, returning on the seventh day, when I removed the stitches and found the wound entirely healed. She returned to her home the following day, and has not since had any recurrence of pain.

Specimen removed, $9\frac{1}{2}$ centimeters. (See Fig. 2.)

CASE NO. 4. Miss M. D., Lancaster, Pa.; age thirty-two. Neurectomy of left inferior dental nerve. Operation February 7, 1901, for tic douloureux of two and a half years' duration.

During the first two months she had but few attacks of pain, which were felt in the teeth and gums; and in November, 1899, she consulted a dentist, desiring to have the teeth extracted, but he advised conservative treatment. Another dentist was consulted, and patient persisted in having removed, at intervals, the molars and bicuspid on the lower and upper left side. All these were decayed, but could have been saved. Patient experienced no pain in the upper teeth, but had them removed, hoping it might influence the pain in the region of the mandible.

At the instance of Dr. Becker, the patient consulted me, one month prior to operation, in reference to removing the nerve. It was quite clear that she was suffering from tic douloureux of the inferior dental nerve, but also from neurasthenia and anemia. In the hope of avoiding an operation, which was certainly not desirable in view of the associated conditions, I placed her upon increasing doses of strychnin, and, in addition, gave her large doses of iron. At the end of one month she maintained that the pain was not relieved, but had slightly increased, and that she could bear it no longer. The treatment, however, had improved the associated conditions considerably.

Operation under ether in the clinic of the Pennsylvania College of Dental Surgery: The operation was similar to that in case No. 2, excepting the closure of the wounds. In the hope of avoiding any depression at the site of the incision, I sutured the periosteum, muscle, and fascia with buried catgut sutures, using Halstead's subcuticular to close the wound in the skin and employing no drainage. The patient recovered splendidly, and I removed the skin suture in one week, the wounds having healed by primary union, and the patient returned home.

The pain was relieved, but she has complained of a numbness and sense of stiffness in the lip and chin, and of various other symptoms attributable to her neurasthenic condition, for which she is receiving appropriate treatment.

FIG. 1.

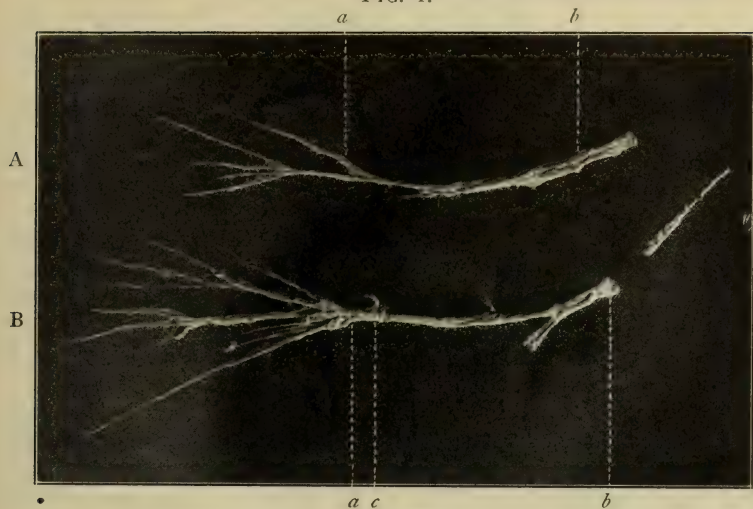


FIG. 2.

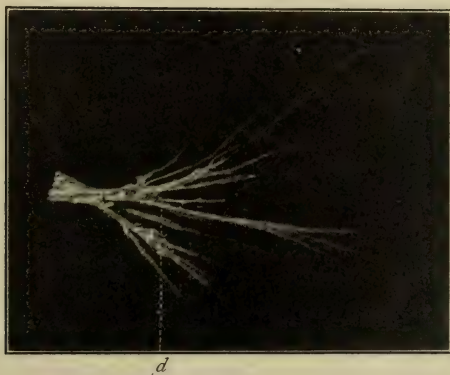
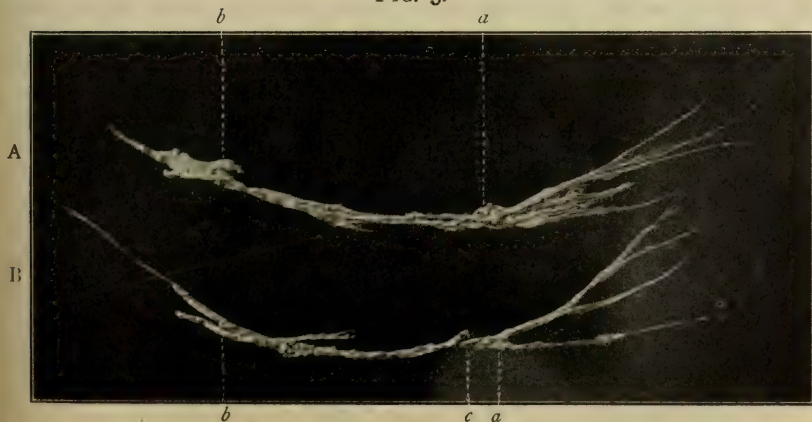


FIG. 3.



(Figures reduced one-half.)

a. Portion passing through mental foramen. *b.* Portion passing through mandibular foramen. *c.* Portion of incisive branch. *d.* Portion passing through infraorbital foramen.

Specimen removed, 13 centimeters. (See Fig. 1, A.)

CASE NO. 5. Mr. H. A. M., Camden, N. J.; age fifty-four. Neurectomy of the right inferior dental nerve. Operation February 21, 1901, for tic douloureux of three years' duration.

Patient consulted me two weeks prior to operation, at the instance of Dr. I. G. Sieber, wishing to have the nerve removed. Three weeks prior to this time he was forced to abandon his occupation on account of the severity of the pain, and was deprived entirely of sleep. His physician, having previously exhausted all forms of treatment, was now compelled to give him a hypodermic of morphin each night to induce sleep. I placed him upon increasing doses of strychnin, and endeavored for two weeks to reduce the daily quantity of morphin; but neither the pain nor the demand for morphin were lessened, and the patient threatened self-destruction if he could not obtain relief.

Operation under ether in the clinic of the Pennsylvania College of Dental Surgery: The operation performed in this case was similar to that in case No. 4, and the same methods for closing the wound were employed, with the same results. Pain was entirely relieved, and he has not had the slightest recurrence of it.

Specimen removed, $17\frac{1}{2}$ centimeters. (See Fig. 3, A.)

So far, the hope which I entertained in adopting the method described in the above report of cases has been realized. I clearly recognize that the lapse of time since operation was performed has not been sufficient in any case to admit of claiming the accomplishment of permanent relief, but the results are certainly most gratifying and promising.

In addition to the complete relief obtained and the safety and expediency of the procedure, there was practically complete preservation of the associated functions with the minimum amount of deformity.

Four of these cases demonstrated the feasibility of removing the inferior dental nerve from the foramen ovale to the median line of the face, through two incisions of one and one-quarter inches each, without injuring the motor branches of the third division, Stenson's duct, the branches of the seventh nerve, and the facial artery and vein. The periosteum with its attached muscles being sutured in position prevents retraction or atrophy of the muscles. At the same time, the deep portion of the lingual nerve can be removed.

The application of the same principle is also demonstrated in the case of the removal of the second division.

I wish to note that, in the four cases in which strychnin was administered, Dana's treatment was not adhered to in the following two particulars: the drug was not given hypodermically, and absolute rest was not enforced. Therefore, these cases cannot be cited as evidence against Dana's treatment.

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CORRESPONDENCE.

"A CHARGE OF PLAGIARISM."

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—Dr. Broomell has not improved his position by the letter which you published from him in the September issue of the DENTAL COSMOS. His choice of only three compared paragraphs out of seventeen is most misleading to your readers, and quite fails to convey an idea of the evidence we produced in support of our charge against him.

We charged Dr. Broomell—"First, with the appropriation of a method of forming the matrix for Porcelain Inlays which we originated—see March *Quarterly Circular*, 1899—and subsequently made more perfect at the suggestion of Mr. J. H. Badcock, of London, and, secondly, with appropriating our description, but largely spoiling it in his desire to appear original. He makes no mention either of C. Ash & Sons or of Mr. Badcock in his paper."

The *method* of making Irregular-shaped Inlays, which we claim to have originated, consists of *taking the impression of the cavity in wax, imbedding same in plaster of Paris, boiling out the wax, and swaging foil in the plaster mold to form the matrix for the inlay*—as distinct from the burnishing-in method. The Inlay Swager is not the *method*, and we should never have thought of calling unfavorable attention to Dr. Broomell's paper if the swager only and its uses had been described by him.

Dr. Broomell says: "Mention was made over and over again that the apparatus was their production, and the clinician made no claim to originality." Without more than merely remarking that

mention is not made once in print, let us again say that it is not a question of the apparatus (swager), but of the *method* which he demonstrated and described in his paper without one word of acknowledgment.

He further says: "In regard to the charge of plagiarism, I most emphatically deny any intentional transgression." We are not concerned with Dr. Broomell's intentions or motives; we can only deal with the facts as they appear in print. No less than five and a half pages of the DENTAL COSMOS are taken up by the paper and the reported discussion upon it, and yet not the slightest reference is made to the originators of the *method*.

We should have been extremely foolish had we confined ourselves to a comparison of the three paragraphs quoted by Dr. Broomell, which in themselves are of little importance. We took the whole of his paper just as it appeared, and could come to no other conclusion than we did.

Owing to the absence of all reference either to C. Ash & Sons or Mr. Badcock in Dr. Broomell's paper and the reported discussion upon it, we much regret that we are unable to retract the charge we have made against him.

Yours faithfully,

LONDON, September 13, 1901.

C. ASH & SONS, LTD.

THE GEORGE H. CUSHING LIBRARY AT LOS ANGELES.

A SHORT time before his death, Dr. Cushing donated his books to the College of Dentistry of the University of Southern California to form the nucleus of a library.

It has been decided to make this library a memorial to his name. Certain publishers have very kindly donated books for this purpose free or at nominal cost.

It seems to us probable that many of Dr. Cushing's friends would be glad to give to this library valuable and rare books or files of journals possessed by them. The names of the donors will be duly entered in each volume so given, book or magazine. Correspondence with such is solicited. Address

DR. GARRETT NEWKIRK,
203 S. Broadway, Los Angeles, Cal.

TO THE DENTAL PROFESSION OF THE UNITED STATES.

CAMBRIDGE, MASS., September 21, 1901.

BE IT KNOWN that I, EDGAR O. KINSMAN, D.D.S., of Cambridge, Mass., secretary of the Massachusetts Dental Society and of the Northeastern Dental Association, do hereby declare that the use of my name on the letter-heads of the St. Luke's Hospital, of Niles, Mich., is without my knowledge and consent. I declare it to be a fraudulent use of the same, and make this public declaration to set

myself right before the profession and maintain my honor as an officer of the above-named societies.

(Signed) EDGAR O. KINSMAN, D.D.S.

COMMONWEALTH OF }
MASSACHUSETTS } SUFFOLK, ss.

BOSTON, September 24, 1901.

Personally appeared before me, the above-named EDGAR O. KINSMAN, and made oath to the truth of the above statement subscribed to by him.

Before me,

WALDO E. BOARDMAN,
Notary Public.

PROCEEDINGS OF SOCIETIES.

INTERNATIONAL DENTAL FEDERATION: FIRST GENERAL MEETING, HELD AT CAMBRIDGE, ENG., 1901.

WEDNESDAY, AUGUST 7TH.

THE first meeting of the Federation was held in the Physiological Theater, University Museums, on the morning of Wednesday, August 7th, when the Federation was welcomed to Cambridge by the deputy vice-chancellor of the university, SIR MICHAEL FOSTER, M.D., F.R.S., M.P., who said:

Mr. President and gentlemen,—The vice-chancellor of the University of Cambridge is, unhappily for us, obliged to be away from the university at this period, and in his absence he has asked me to act as his deputy and to bid a most hearty welcome to this important International Dental Federation. I understand that its international character is assured by the participation in it of seventeen different countries, and I assure you that this ancient town feels it a compliment that you have chosen it as one, if not the very first, for your visit. The vice-chancellor trusts that your visit here will be both profitable and agreeable: that it will be profitable will rest mainly with yourselves; that it shall be agreeable we have done our best to insure.

THE PRESIDENT (Dr. GODON). Sir Michael Foster, ladies and gentlemen: Permit me, in the name of my colleagues of the International Dental Federation, to thank the vice-chancellor and the members of the council of the University of Cambridge for the kind hospitality that has been tendered us in these ancient buildings, where generations of students and professors, many of whom have become illustrious, have succeeded one another. No place could be more appropriate for our labors than Trinity College, where the names of Newton, of Roger Bacon, of Macaulay, of Tennyson, of Dryden, and many others present themselves spontaneously to our minds to inspire us and to encourage us in the work of universal union and of international education that we have undertaken.

And no one is better qualified to receive us than Sir Michael Foster, the learned representative of the vice-chancellor of the university,—Sir Michael Foster, the eminent physiologist whose

name has become universally famous through his scientific work. He welcomes us to-day with the same kindness with which, as president of the British Association, he welcomed my countrymen at Dover in 1899. In the name of the Executive Council of the International Dental Federation, and in that of the International Commission of Education, I beg to tender him the sincere expression of our gratitude and respect.

SIR MICHAEL FOSTER. Mr. President and gentlemen: The ancient university to which I have just had the pleasure of bidding you welcome, and which numbers among its illustrious men, in addition to the names which your president has mentioned, that of William Harvey, presents somewhat medieval features which are lost to other universities,—features medieval, but modified by modern development.

In the earliest days of the university every one who attained the title of Doctor thereby gained the right to teach. He, in those early days, taught in any room he could, in one which he hired for the purpose with his own scanty earnings, or in one which was granted to him by the benevolence of others. His pupils in like manner lived where they could, sometimes in such lodgings as their poor purse could secure, sometimes enjoying the hospitality of benefactors. In the course of time the university became able to make provision for its teachers,—if not for all its doctors, at least for those whom after a while it came to speak of as professors. The students, on the other hand, found it to their profit to gather together in common lodgings, which came to be called hostels.

In most countries other than England, while the provision made by the university for its teachers has enjoyed a large development and all universities have now their lecture theater, their museums, their libraries, their laboratories, and their halls for solemn occasions, the hostels have for the most part been broken up and the students left to shift for themselves. In England, on the other hand, the country having been for centuries secure on the whole from invasion and war's destructive effects, the hostels have flourished more and more. In course of time, after in some instances a temporary connection with religious orders, they have developed into what we here call colleges,—institutions which are hostels in the sense that they afford lodgings for the students, but which do much more than this, in that, over and above what is done by the university, they afford teaching of a very varied kind, and moreover have entered into special relations with the university itself. Each college, in fact, is in many respects, in Cambridge, a small university within the mother one. Here at Cambridge we have seventeen colleges, in addition to institutions which we consider as and call mere hostels, seventeen small universities having complicated relations with the university itself and carrying out much of the teaching,—performing, in fact, almost all university functions save that of giving a degree.

Such a state of things could not help leading to a certain rivalry between the mother and the seventeen daughters. The prosperity of the colleges was more or less inimical to that of the university,

and indeed for many years the university, as distinct from the colleges, somewhat languished. During the last generation or so, however, it has undergone great development and expansion.

You are gathered to-day in a university which, like its sister university of Oxford, bears more distinctly than do most of the other universities of Europe the stamp of early and medieval times, preserved by the predominance of the colleges. You may recognize this in the direction and respective relations of the studies carried on in the plan. In old times there were three faculties in a university,—Theology, Law, and Medicine, corresponding to the three pursuits which demanded at that time book-learning. For the university was founded for practical purposes, and only these three pursuits as yet needed book-learning; the soldier, the merchant, and the manufacturer could do without it. Later on there grew up a faculty of Arts for the protection and advancement of those more general studies which furnished an introduction to the three special practical studies. He who aspired to be a doctor of theology, law, or medicine spent much time in this common learning before he specialized for his profession. In the course of time the colleges took up with vigor this common learning, leaving the more professional studies to the university itself. Moreover, partly from the circumstances of their origin, their early connection with religious orders, partly from other influences, the colleges, and with the colleges the university, became more and more associated with the church, the Established Church of England. And, indeed, during the early and even the middle part of the past century the university and the colleges seemed to belong to the church. The university became the training-place for nearly all the clergy, and gave them all they needed, while some lawyers only, and even fewer doctors, sought its aid, and received there not a professional, but solely a general education. The last generation has, however, seen great changes. The ties with the church have been loosened, professional studies have been encouraged, and in an increasing manner not clergymen, lawyers, and doctors only, but men of other professions and pursuits,—the engineer, the farmer, the man of business and commerce, the manufacturer, and even the soldier,—are knocking at its doors and seeking for professional as well as general education.

At the present moment you will find this university, like other seats of learning and education, busy with the question, What is the best kind of education for each profession and pursuit?—a question which is also stirring you.

All, I venture to think, are agreed that education should be fashioned after the manner of a cone, starting from a broad basis and narrowing to an apex, for it is the conical bullet that has penetrating powers. In the storm and stress of modern life an all-round education, such as makes a man a mental sphere, is not in itself adequate. Spheres move readily one over the other, and spherical education may be good in society, but it is not suited for a profession. The round ball thrown at a surface *may* make a hole, but more frequently simply rebounds; whereas the cone may be de-

pendent upon to pierce, and the man whose education is conical makes his way.

For each profession the cone should be different, should be fashioned in different ways, though in each case it should start from the same broad basis,—namely, the broad basis of the discipline of the school; that is, the boy's school. I say the discipline rather than the learning of the school, for the aim of the school-master should be in all cases the formation of the mind,—the setting of the instrument, not the filling of the bottle. The growth of habits of accuracy, of intentness, and of alertness, this rather than the gathering of mere knowledge of facts is the proper heritage of the school, and for the attainment of these habits it matters not so much what the boy is taught as how he is taught.

From this broad basis of a general school education the narrowing of professional training begins, and we thus come to the question which interests us to-day; that is, the narrowing of training which is best for the dentist, and how shall it best be brought about? On this it would not be fitting that I should do more than offer a few general reflections.

The dentist is a healer; his business lies with a very small portion of the human frame, but that portion, though small, is still human; it has its diseases, its failings, and the dentist has to cure these,—bringing in, whenever it be possible, that best of cures, prevention. The training of the dentist is, in broad terms, the training of a healer.

I remember that in my young days a celebrated surgeon used to say that a surgeon was a physician and something more, meaning that he had to possess a general knowledge of disease such as the physician possesses, but had, in addition, not only to know certain features of disease which the physicians might neglect, but also to acquire a manual dexterity which the physician never needed. In somewhat the same way we may say that the dentist is a surgeon and something more. He has, like the physician, to possess a general knowledge of disease, and to possess, like the surgeon, a certain skill of hand; but besides this he has to acquire a special manual dexterity never called for in a surgeon, and to possess a special knowledge of metallurgy, of chemico-physics, and of branches of mechanics of which neither the physician nor the surgeon need know anything at all.

All knowledge is useful, but the power of the human mind to attain and retain knowledge is limited. We cannot all know everything. The surgeon need not, and if he is to excel greatly in his art cannot know all the minutiae of the physician's calling; he cannot at once be an accomplished surgeon and complete master of all the details of auscultation and the intricacies of neural pathology. In like manner the dentist, if he is to excel in his art, cannot hope to know all that the physician must know and the surgeon must know. Such being the case, where shall we begin to narrow the education of the dentist? for narrow it we must. How are we to differentiate the training of this special healer from the training of the general healer, the physician or the surgeon?

The training of the doctor is partly general, partly special. His special training ought to be as full and as complete as possible; he cannot know too much, he cannot be taught too much of actual disease and of the various means to combat it. His general training stands on a different footing. The object of this is to enable him to understand and judge the special knowledge which he has to acquire, and though from one point of view no general education can be too wide, from the point of view of the demands of actual life that general education is sufficient which secures the above object and which adequately prepares him for the special training which follows. The main elements of the doctor's general training are these: He must know general pathology, the nature of the processes of disease. This is the central element, the fundamental element, absolutely necessary for the understanding of the true nature of individual maladies, and time spent on this is time wisely and economically spent. Further, he must know physiology and anatomy, but there is no need to carry his studies in these further than is sufficient to enable him clearly and fully to lay hold of the truths of pathology and the laws of health, and to impress on his mind such details of topographic anatomy as will always stand him in good stead in his practice as a physician or a surgeon. Lastly, he must know physics and chemistry, for without a certain knowledge of these he cannot understand physiology, and must remain really ignorant of pathology.

The dentist, like the doctor, needs a general as well as a special training. What can be said about the general education of the dentist? And when I say "dentist" I mean the scientific dentist, he who does his work not by mere rule of thumb, but in the light of scientific knowledge and under the guidance of scientific principles,—for it is with him alone, I take it, that we are interested here. What ought the scientific dentist to undergo in the way of general training?

I imagine that I shall not go far wrong when I say that, in common with the doctor, he ought to possess a general knowledge of pathology. He has to deal with disease, with disease of the teeth and, indeed, of the mouth, and he ought to be well acquainted with the general truths of pathology. He need not be carried further into the details of disease than is necessary to enable him to understand general morbid processes and the common ways in which living structures go wrong. But he may with profit be led to spend some considerable time on that division of pathology which teaches how many of the ills that flesh, even the hardest part of it, is heir to are the handiwork of minutest organisms, are scourges laid on by invisible rods. What we now call bacteriology must, so far as it deals with disease, be an essential part of every dentist's training. Beyond this the dentist needs, like the doctor, such knowledge of physiology and anatomy as will enable him to lay hold securely of pathology, but in his case the details of the topographic anatomy of the body at large are not needed, and may fitly give place to a knowledge of the anatomy and physiology of the teeth, more special and more complete than is ever needed by

any doctor. Such a general training is one more or less common to both the dentist and the doctor. But the former has also need of a general—that is, of a preparatory—training wholly uncalled for in the case of the latter.

The days when the public mainly judged of the merits of a dentist by the celerity and freedom from pain with which he robbed his patient of possessions which could never be really replaced are long gone by. The art of the dentist is now pre-eminently a constructive and preservative art. And the dentist, if he is to succeed in construction, must know the nature of the materials which he constructs, and the physical, mechanical laws of the construction which he attempts. If, in order to grapple adequately with disease, he must share in the general training of the doctor, he must, in order to grapple with the difficulties of repairing the ravages of disease which he and others have failed to prevent, share in another general training of a wholly different kind. He must be inducted into some, at least, of the mysteries of metallurgy; he must have a scientific knowledge of the chemical and physical properties of the varied materials which he uses for construction, and he must learn something of what may be described as a special branch of engineering. He must be trained in ways and things wholly unknown to the physician and the surgeon. Moreover, if he is to hope to succeed in his profession, he must know the things of which I am speaking not only theoretically, but practically. Just as the young doctor begins his practical hospital duties by dressing wounds and acting as a nurse, as the general who commands armies has at the beginning to take his place as a private in barrack-square drill, as the young engineer puts on his blouse to go through the workshop, so the young dentist must spend an allotted time at the bench.

Obviously the training of the dentist, much as there always must be in it common with that of the doctor, must be narrowed in its own way if the cone of education is to be brought to an effective apex.

Doubtless the dental profession has much to gain in many ways by a close alliance with the medical profession. The position of being a branch of the great and powerful medical profession gives it advantages many and great, and it would be folly to cast away these advantages by demanding a divorce unless that divorce be really necessary.

One object, and one object only, ought to be the aim of the training of a dentist,—to make him as sure and as efficient a workman as possible. If, as seems probable, in the rush of men and things, ordinary minds under ordinary circumstances cannot achieve that efficiency and at the same time pursue a complete medical education, then some separation seems inevitable. The separation, however, should not be a divorce, but simply a deviation or differentiation, a claim for a separate apex hand in hand with the acknowledgment of a common basis.

MASSACHUSETTS STATE DENTAL SOCIETY.

(Continued from page 1216.)

PRESIDENT DOWSLEY. The next paper on the program is one by Dr. SAMUEL A. HOPKINS, of Boston, entitled "Science as a Teacher of Prophylaxis."*

Discussion.

Dr. G. P. WIKSELL, Boston, Mass. Mr. President, I want to express my delight with the paper which has been read. Many of the suggestions are new to me; some of them I have put in practice. The manner of taking care of my patients' teeth, one I have been working on for several years, is this: I have a future appointment with every patient at a specified time. If they do not come at that time, I do not feel responsible for what takes place in their mouths. When I see a patient I look to see if there is anything above the eyes. We have got to have intelligence before we can teach people what to do. We may use plugs for their teeth, but we have also got to plug something into their minds.

Every patient of mine knows that I have not a pound of white flour in my house and never have had. Neither did my father. He was rated a crank on this subject, but my teeth are just like flint owing to the diet that he prescribed for his children. Strange to say, my wife was brought up in the same way. I think the matter of diet is the key to the whole situation.

Dr. L. D. SHEPARD, Boston, Mass. I have listened with great interest and pleasure to the instructive and hopeful essay just given, and heartily congratulate the author. I wish I could have the same faith that he has in the general success of the methods he has outlined. I have no doubt of its good results in a measure, and would rejoice to see his instructions followed. There can be no question of the prophylactic effect of extreme cleanliness. A part of my want of confidence is based upon the comparative failure of my attempts years ago, enthusiastically entered upon, to improve the tissues of the rising generation by physiological feeding and thorough mastication.

The modern chemist and miller in the preparation of food, and the modern cook, give only soft pap as the food for children. It is with our children that we must commence the attack in this line, but I must say that all my efforts for the past thirty years have produced few favorable results. It is largely for this reason that I have little confidence in any prophylaxis which will diminish our needfulness as the restorers of decayed teeth. I envy the enthusiasm of any one who will go into the work as our friend has outlined it, and I trust that in the millennium will be seen the fruition of the hopes which have been expressed.

Mr. THOS. FILLEBROWN, Boston, Mass. Mr. President, I did not expect to say anything on this subject because I am not competent to discuss a paper of this kind. I endorse both sides of the question, but I think the real truth of the matter lies between the

*Printed in full at page 1142 of the issue for October.

two views of it. A friend of mine illustrates this. He is thinking all the time about what he shall eat and what he shall not eat. One of the things which he said was that oatmeal that was boiled would not digest because the saliva would not act upon it when boiled, consequently it would ferment and not digest in the stomach. We all know that people are eating it all the time and thrive in spite of all theories.

No organ is healthy unless it has something to do. Just so long as the digestive organs are furnished with digestive pap and have nothing to do the system is weakened. The athlete becomes strong by exercise and making all the organs do their proper work. We find development of the organs only where they are made to do their work.

I saw some skulls about seven or eight hundred years old in which the teeth were still in place but were all worn down by the grinding of the food. Their food was grain, pounded up and for the most part eaten without cooking at all. Notice the aborigines of this country and all classes of people who rough it for a living. They are strong, muscular, and have good teeth because of exercise. There is no question that the plan suggested by this paper is the line on which we must make our improvement, and the man who does not follow on that line is lacking in his duty to himself, his patients, and the general public.

Dr. CHAS. H. GERRISH, Exeter, N. H. Although a stranger to most of you, I should like to express my appreciation of the paper which we have had the pleasure of hearing. I have been forty years in the practice of dentistry, but I claim to know nothing of the scientific side of this subject. As I said, I claim to be the humblest of men and to know nothing about this subject, but this I do know, that the gentleman who last spoke has touched the right idea of the subject. We as dentists depend too much upon machinery, and do not try to preserve the teeth from failing. It is a great deal easier to cut the tooth off than to bother with trying to make people understand how to avoid the need of this kind of work. The intelligent dentist places his mark upon his work. He improves every opportunity for enlarging his usefulness. We have to-day such an easy way of making up the losses of the teeth that it is simply a question between preservative work and operative skill. Every dentist should, from the time that the teeth erupt, make it his duty to look after them. If you can get the children to come to you and will take the orangewood and pumice-stone and polish these teeth thoroughly and instruct the patient to use the silk and the tooth-brush, you can to a great extent prevent decay. The trouble is, you are all trying to be skillful in making up the losses, and do not give enough attention to the simple and fundamental polishing of the teeth as a means of preventing decay.

Dr. CHAS. A. MEEKER, Newark, N. J. I have listened with great pleasure to Dr. Hopkins's paper. It is such men, with a love for scientific research and the time, who do a great deal of good for dentistry. I do not think the practicing, everyday dentist has that

opportunity for research. I think the dental associations throughout the country should encourage this work and lay aside an annual income to be so applied. I firmly believe one point of the paper, and that is insisting upon absolute cleanliness in our work. We all know that there is considerable temperamental difference in our patients. I have been in the habit for the last two or three years of insisting that they shall use a good tooth-paste and put it on the tooth-brush in a dry state before scrubbing the teeth. My reason is that the antiseptic properties of the paste will go into the interstices of the teeth, where all our first trouble comes, by decay; it is not on the surface, where it can be easily cleaned. I am glad to say that since I have used this method I can see a great improvement and the lessening of approximal cavities.

Dr. C. FRANK BLIVEN, Worcester, Mass. We have all to thank the writer of this scientific paper which has been so instructive and helpful. It seems to me that in his last words Dr. Hopkins touched the most vital point in his whole paper,—the power of destiny.

We know very well that "one swallow does not make a summer." It is no one of the methods that have been discussed that saves the teeth. Many of us have practiced prophylaxis, prescribed the various foods supposed to build strong structures, recommended antiseptics, advocated and practiced all known methods for the building and preservation of the teeth, and yet have not saved them. Under certain conditions the teeth do break down, to our mortification and regret. How shall this be prevented?

The beautiful ideals which Dr. Hopkins slightly suggested were to me the most valuable part of his paper. The solution of the problem lies in the fuller understanding of our own being, in recognizing the laws which govern our physical, mental, and spiritual natures, and seeking as individuals to live in harmony with these laws. Our responsibility as dentists requires this of us, that we may be able to teach our patients how to live. No methods more superficial will accomplish the desired end. When we can do this we shall be dentists worthy of the name.

Dr. T. D. SHUMWAY, Plymouth, Mass. It seems to me that the vital point of the essay is that we have developed too much the mechanical side of dentistry and lost sight of the remedial or medical side. The question as to what we shall eat and drink to make teeth sound, I think much of it is pure speculation. I am always glad to get a circular from a new dental laboratory, as this shows a tendency to separate the mechanical from the operative practice. The one who devotes his time to the care of the natural teeth should be able to make something of his brains as well as his fingers. Operative practice should be a specialty of medicine. Bridge-work is in the line of mechanics and should be made on prescription the same as spectacles. The best piece of bridge-work I ever saw was made by a jeweler. I once paid ten dollars for an examination of my eyes, to be told that I needed glasses. This is the standard we should set for operative dentistry, if we would be a liberal pro-

fession. The central thought of this paper, it seems to me, is that we should give more attention to the care of the natural teeth, and teach the patient how best to preserve them. I hope this paper will be read by the dental profession.

Dr. S. A. HOPKINS. I thoroughly recognize that one of the most important causes of the loss of teeth is the lack of functional activity caused by civilized methods of living. This matter will be fully treated in a second paper on this subject. I do not, however, want this audience to go away feeling that they have heard something which is impracticable. I am thoroughly convinced that no line of treatment which can be laid down is as practical as the one I have outlined. The man who has never tried seeing his patients (beginning with them as children) every two, three, or four weeks, as the case may be, has failed to take advantage of one of the best systems that could be devised. No man who will adopt this system can fail to prevent trouble provided he has the co-operation of his patients.

Dr. ANDREW J. FLANAGAN, Springfield, Mass., read a brief paper entitled "True Professional Life a Fine Art," upon which there was no discussion.

The following paper, by Dr. J. WESLEY SHAW, of Springfield, was then read by the author:

A CASE OF TONGUE PARALYSIS OF DENTAL ORIGIN, WITH
RATIONALE AND TREATMENT.

This paper was read before the Valley District Dental Society several months ago, and by their request I present it at this our state society meeting. My only excuse for doing so is that I was afraid to refuse our local society, for, as you may well know, it contains some pretty good fighting blood.

The case occurred in my practice some five years ago, and at that time was a new one to me, not having read or heard of a similar case, nor have I known of one similar since; that is, a case of reflex neuralgia followed by paralysis. If this be a familiar matter to you, I hope that you will pardon me for boring you and taking valuable time.

A patient brought to my office her friend, a stranger to me, with the request that I make an examination to find the cause of her trouble, saying that her friend had been "stricken dumb." She stated that the latter had been suffering with severe facial neuralgia for two weeks, and had been treated for this affection by her physician with negative success. On the morning before (Sunday) she awoke to find her pain gone, and consequently felt greatly elated; but on going to the kitchen and attempting to tell the milkman the quantity of milk required, she found, to her great astonishment and consternation, that she was unable to articulate a solitary word, and could do nothing more than make a hideous noise. The milkman looked at her in amazement and fled, no doubt thinking her insane.

Taking as a cue the fact that she had had facial or temporal neuralgia immediately followed by tongue paralysis, I inferred that her trouble had probably a dental origin. Recalling the nerve dis-

tribution to the head and face, with the lingual nerve, which is both sensory and motor, anastomosing with the hypoglossal, which is purely motor in function and supplies the muscles of the tongue, I began to search for the cause of the disturbance. After casually examining the young woman's teeth, I inquired if there had been any disturbance in them, and she shook her head. I then began a still hunt, employing the usual methods,—namely, percussion, transillumination, and the hot and cold tests. Possibly by intuition, but principally by the process of exclusion, I located the seat of the disturbance in the upper left bicuspid tooth, which had a large amalgam filling disto-approximally. Her teeth were the worse for wear and the ravages of decay, and were heavily filled with large gold and amalgam fillings.

When I intimated that I thought this tooth to be the cause of her trouble, my patient protested with a shake of her head, and signified that she wished to write something. On being given a pencil and paper, she wrote, "That tooth never troubled me." Nevertheless I insisted on opening into the tooth, and she, with no good grace, allowed me to proceed. On the removal of the filling I found that the buccal cornu of the pulp was gangrenous and the pulp tissue degenerated, being below normal in sensibility,—not dead, but with a slightly lowered vitality, presenting just such a condition as we often observe giving rise to reflex neuralgia.

Wishing to retain the tooth, I applied paste for devitalization, and dismissed the patient with the assurance that I had found the seat of the trouble and would soon have her relieved. That evening, on being surrounded by her friends and acquaintances, who added fuel to her alarm and hooted at the idea of a dentist treating her trouble, and not being exactly satisfied with my treatment in selecting and treating a tooth that had never troubled her, she determined to consult another physician. She applied to one of the most eminent in the city, who kindly and honestly told her that he did not know the cause of her trouble and should not know just what to do for her, and said that if her dentist had located the trouble in a tooth he had confidence to believe that he knew what he was about, and advised her to return to him and continue until cured.

She came to me the next day (Tuesday). I noted that there was no perceptible improvement, and I had hardly expected any. By way of placebo, and also with the hope of stimulating the nerves involved, I made use of my electric battery, passing the faradic current from the base of the brain to the floor of the tongue. Wednesday my patient was a little improved; could move her tongue slightly, but could not articulate, the end of the tongue in particular being paralyzed. I continued the electric treatment. Thursday I attempted the removal of the pulp, with partial success. To the remaining pulp filaments I made an application of trichloroacetic acid, which I sealed in. Friday I removed remaining pulp tissue from the root-canals, used carbolic acid as a dressing, and sealed again. The patient felt almost restored to speech, the tongue a little stiff, but working overtime to make up for time lost. The

root-canals and tooth were filled on the following day, and the patient discharged as cured.

I have seen this patient at yearly intervals since that time, and she has been free from neuralgia or paralysis.

Of course, gentlemen, at the present time in a similar case I would make use of cocain and remove the pulp immediately, but at that time—five years ago—I was not using cocain as freely as at the present time.

The author concluded his paper with a minute description of the anatomy and function of the nervous relations involved in the production of the reflex phenomena observed in the case reported, and upon which he had based a successful diagnosis. There being no discussion,

Dr. M. C. SMITH, Lynn, Mass., read the following paper:

A CASE OF INFANTILE SCURVY.

Scurvy, the subject selected for this paper, is one of vast importance to the dental profession. How much of the diseases of the mouth in early childhood can be attributed to that dread disease remains to be proven; at least, it is a disease that should receive our earnest attention.

May 21st. Was called to Nahant to see a baby eleven months old. His diet had been confined to one of the proprietary foods. The parents had noticed that he had been ailing for some three or four weeks, and now was fast growing worse. They attributed it to teething, while the family physician had made a diagnosis of tubercular hip-joint disease, and was treating him accordingly. He then had him on a tonic with maltine and cod-liver oil.

Found the little patient suffering greatly, the mouth being in a terrible condition. The doctor had lanced the gums that morning. For about an inch on either side of the median line the gums were swollen to nearly the size of my little finger, and looked spongy and bad. He had erupted three teeth, two lower and one upper, and one of the lower had a piece broken out of it and looked like caries.

He had not used one limb for several days, and the slightest motion of the joint caused him to cry. In fact, it resembled hip-joint disease to a marked degree. The slightest motion, as in rocking, caused him to cry, and it was almost impossible to touch him anywhere on the extremities, no matter how lightly, without causing him to cry vigorously, and to move the hip joint would almost throw him into spasms. General appearance bad,—very pale and anemic.

The food that he was taking was quite constipating, and on that account the doctor had that morning ordered his food changed. This I objected to, for fear that a change of food might produce a diarrhea, and we would not be able to get the best effect of the fruit juices.

The treatment that he was on was not changed at all, only the fruit juices were given as much as the child would take without affecting his bowels. He was put on orange-juice, that night tak-

ing about half an orange. For the first few days he was given a little lime-juice, but that was soon discontinued for the milder acids. The mother reported that the improvement began that night, for he slept better than he had done for some days.

May 26th. Looks decidedly better; has no tenderness on touching him; moves the hip readily, and, in fact, will kick as much with that limb as with the other, while before he would not use it at all; mouth much better. Over the tooth that was about to erupt was a bleb about the size of the end of my little finger, of a dark purple color.

June 2d. Seems like himself again; the mouth in nearly normal condition. Recommended a diet containing a little more fruit and vegetables, and, as I had every confidence in the family physician, considered there was nothing further for me to do.

Discussion.

Dr. ANDREW J. FLANAGAN, Springfield, Mass. I believe there was a case of this kind reported to the society by Dr. Shaw, which was a very interesting case. I hope he will give us some discussion on the matter.

Dr. J. WESLEY SHAW, Springfield, Mass. The case referred to by Dr. Flanagan interested me particularly at the time because some little time previous to this child's being so alarmingly ill I had been called and had lanced the child's gums for the eruption of the incisor teeth. About this time the child was troubled with what the physician was pleased to call rheumatism, and was under treatment for that trouble, but continued to grow worse. His knee joints and the various joints of his body seemed to be sore and were painful on flexion, and his flesh soon afterward became very tender and sore; the gums became swollen, and an eruption broke out all over his body. This eruption was of a peculiar, scaly nature. About a month after the gums were lanced the father met me on the street and said, "I wish you would go and see my baby." I asked him what was the matter, and he said, "He is not going to live; the doctor says there is no hope for him." Being personally interested in the father of the child, I thought I would call round that evening and see how the child looked. As I approached the house I met the physician just coming out. I said, "Doctor, what is the trouble?" He said, "The child is going to die." Then I asked him what was the trouble with the child, and he said, "It is a case of blood-poisoning." I asked, "What could have happened? When I saw him last he seemed to be perfectly healthy, aside from his rheumatism; why should he die of blood-poisoning?" "Well," said the doctor, "we do not expect the child to live until morning. We had a council of physicians this afternoon, and have decided that it is a case of blood-poisoning and there is no hope for the child." I went in and saw the child, saw the general condition, and that the family had very little hope. I noted that pus was discharging from about the partially erupted incisors, the gums being greatly swollen and badly congested. The child's head and face was a mass of scabs, eyes swollen so badly that they were closed.

Not being satisfied with the "council's" diagnosis, it occurred to me that Dr. Kirk had mentioned a case of infantile scorbutus which was just a parallel to this one, and I looked back over the journals and finally succeeded in finding it. Reading it through, I saw that it was an identically similar case. I then telephoned the doctor, and he said he would remain in his office fifteen minutes for me, as he was very busy and did not have much time. Hurrily going to his office, I said, "I want you to read that paper of Dr. Kirk's, on Infantile Scorbutus, as a favor to me, and to read it to-night before retiring. He said, "If you believe everything you read, my friend, you will come up short some day." He promised me, however, to read the article before he retired.

When he got in that night from his evening calls he gave the article by Dr. Kirk a passing glance and retired, but was so disturbed by what little he had read that he got up and read it thoroughly, and from that time until morning he could not sleep; and he got up at four o'clock and went to that patient's house, roused the people, and told them that they should not feed the baby any more of that prepared food, a proprietary food, but should put it on modified cow's milk and orange-juice, saying, "There is hope for your baby!" It afterward turned out that in the consultation the physicians had determined that the child's terrible condition—a similar case they had never seen before—was the result of an infection at the time his gums were lanced. They first thought it syphilis, and then determined it was pus-poisoning (pyemia), and of course this reflected on me and nearly got me into trouble. But, at all events, he made amends for it, and told the parents that if the child lived it was the direct result of my bringing his attention to that article of Dr. Kirk's, and that he believed that they had made a mistake in their decision. It seems that it was the first instance of the kind he had met in his practice. The baby rapidly improved, and to-day is a fine, healthy boy. The case was of vital interest to me, because it came so near getting me into disrepute.

Dr. M. C. SMITH, Lynn, Mass. I hope the essayist will keep track of that patient and report within the year the condition of that child's teeth, and make such reports from year to year. I will do the same, and see what condition these children, who have been the subjects of scurvy, are in,—I mean in what condition their teeth will be later in life.

Dr. J. W. SHAW, Springfield, Mass. I will say that these teeth had erupted for the distance of the crown through the gum at the time this consultation was held.

(To be continued.)

NEW YORK ODONTOLOGICAL SOCIETY.

A REGULAR meeting of the New York Odontological Society was held on Tuesday evening, February 19, 1901, at the New York Academy of Medicine, No. 17 West Forty-third street, New York city. The president, Dr. W. W. Walker, occupied the chair.

Dr. S. B. PALMER, Syracuse, N. Y., read a paper, of which the following is an abstract, entitled:

CHEMISTRY OF ORGANIZED LIFE.

There are three reasons for writing upon this subject at the present time:

First. W. D. Miller, D.D.S., M.D., Berlin, Germany, wrote a paper, which may be found in the DENTAL COSMOS, April, 1900, under the title "Recurrent Decay of the Teeth, with Especial Reference to the Electric Theory." The paper is an able production from the author's point of observation. I make no criticism on that phase of science called *physics*, but upon the other, relating to "chemistry of organized life," which Dr. Miller does not consider worth discussing, I desire to place my own views before the profession, and let the reader be the judge.

Second. Dr. J. Leon Williams, L.D.S., D.D.S., F.R.M.S., London, England, wrote a paper which was read before this society January, 1899, and was published in the DENTAL COSMOS March, 1899. In this article he made a request, as will be seen, so far in advance of the world's acknowledgment of chemical science that presumably it could not be granted. This request was in a measure answered in a paper read before the Northeastern Dental Association at Hartford, October, 1898, and in a paper read before the Massachusetts Dental Society, June, 1899, and published in the *International Dental Journal*, February, 1900.

Evolution in dental science, with the opening of the new century, has taken a stand not to be refuted, but the following are the terms of choice given me to defend evolution in dental science relating to the electric theory: "We show you that lactic acid is formed by certain micro-organisms in contact with enamel which are identical with appearances produced by the artificial application of lactic acid out of the mouth. And yet you go on talking about the absence of a certain vague vital force or certain electrical conditions of the mouth as being responsible for dental caries. We ask you to abandon this position or come forward and astound the scientific world by your announcement of the discovery of some hitherto unknown principles of chemistry."

This is not the first suggestion I have had to abandon the cause which I believe to be scientific and in the interest of dentistry. I am not ambitious to astound the world, but the "hitherto" *rejected* principles in chemistry have been my study for years, and with the development of electricity and recently devised instruments for illustration I believe it possible that many in this audience will become convinced that there is "chemistry of organized life."

Third. I believe that the electric theory has now been carried through the "dark ages" of prejudice.

This society has fearlessly invited discussion upon anything that pertains to the welfare of dentistry. At no time have I felt at liberty to relinquish the work. I see in many ways that the case may now be submitted to younger men, and after this meeting I trust the New York Odontological Society will publish my own version of this electric chemical theory and give it to the profession.

Dental science is now recognized as circumscribed by conditions which can be satisfactorily demonstrated by experiments, weighing, measuring, chemically testing, etc. I quote the following (DENTAL COSMOS, March, 1899, page 212), in which Dr. Williams says, "How is it possible to base any scientific procedure upon hypothetical conditions which are admittedly beyond the reach of science? We have never proposed to investigate the unknowable or the unthinkable. We are simply trying to establish a solid basis of scientific facts upon which we may work intelligently instead of empirically." With this limitation of science it is plain that one of the most important factors in the existence and growth of the tooth is omitted,—the element of vitality or life. And it is equally obvious that no analysis of a result can be scientific which does not carefully consider every factor in its production. Life is a gift from the Creator of the universe to man. Life is a forerunner of knowledge and action. Life is unbounded, and limited only by individual comprehension. This view opens up the way for progress in science. From my observation and belief, there seems to be no other calling or profession in which man is engaged where he has such opportunities to observe the relations of life and matter as he has when thoughtfully operating at the dentist's chair. With such advantages it is difficult to understand how knowledge and facts thus gained can be denied and rejected simply because they cannot be written in tables or demonstrated before an audience.

At times it is difficult to reconcile the sense of touch in excavating teeth for young patients and those of adults with the slight variations of lime-salts that are given in tables. And still another condition is not accounted for by any of the investigations that enter into account in relation to caries. That is, it has been demonstrated that the density of teeth is not a reliable guide to immunity from decay. The solution of this question, as well as several other unanswered queries, stands as a high reward for our young men who are now enjoying the instructions afforded by our ablest teachers in physics. If they will follow their thoughts, over the present boundaries of science, where they can come into possession of facts revealed in life lessons from nature, they will begin to realize that dental caries is a disease.

Dr. Miller's misunderstanding of the vital principles of the electric theory, together with the published findings from experiments which were conducted upon teeth under conditions favorable to his ideas, have been misleading, and do not represent my teaching. Dr. Miller's discoveries have so generally satisfied the profession that nothing more has been desired or acknowledged. All readers will understand that dental science, as now defined, is limited to things and conditions which can be proved and demonstrated by experiments. Starting with life, we know it comes and departs; that its presence is manifested in matter, as in the human body, for illustration. The body contains organs whose mission is to perform specific functions relating to the building up and sustaining the body. The teeth are called the dental organs, but before the tooth was constructed the papilla or pulp was a builder acting under the

direction of the central life of the whole body. Each pulp directs the construction of its special tooth in the dental arch to fill its appointed place in form and time, and to harmonize with each and every other organ. It is not necessary to suppose that the pulp consciously performs its work in such perfect order any more than to think the heart and lungs act consciously. The work, however, is done and done by energy, and that energy is what I call life energy,—organized electricity.

Facts which have been established from clinical practice are now in advance of acknowledged dental science, and there is a feeling of restraint caused by the physical limits of science as it now stands; and, lastly, the recent effort made to set aside the chemical theory,—these things, all combined, may awaken a deeper interest and may give more thought to the evolution of science as applied to filling teeth. The lack of nomenclature to express new ideas—that is, ideas which have not been understood by words in general use—make it difficult to communicate my own belief and knowledge. The secret of the electrical theory lies in its relation to the living organs of the human body. For want of a better term, I have used “organized electricity” instead of animal electricity or vital energy. I will now illustrate by the human body, which is the highest creation of which we have any knowledge. In the study of physics, light currents of electricity are generated by chemical action; and one element of consumption is zinc, which, by decomposition in a fluid, is added to the current. There are no manifestations of life present. I wish to show that electricity undergoes evolution until it becomes life, will, intelligence, etc., in a way similar to the evolution of matter in the body. This conclusion is the slowly gathered result of many years of study and observation.

The few centuries which give record of man's history show evolution in his mental comprehension as well as in physical culture. I believe that one of the “hitherto unknown principles” that is required of the writer is electrical chemistry, by which is meant that electricity which is an energy connected with matter in all its phases from atoms to intellect. Call it by any name, it represents the soul and life energy of matter. By its influence atoms unite to form molecules and innumerable compounds. In physics we learn the laws which govern electricity. It is interconvertible into chemical affinity, heat, magnetism, etc., polarity being a marked condition through all its phases. It is the active energy in chemical affinity. Even marble supports the life of lichen. The important lesson in this connection, as before mentioned, is that electricity in vegetation is associated with instinct, and, going still higher, we find in man thought, reason, and will added to instinct. In 1849, I was impressed with the idea that man is an organized living galvanic cell; that vital energy is received from food; that organized food in evolution corresponds to the elements of a cell using copper-zinc fluid, etc., and that such energy was stored in brain and muscle to be expended for mental or physical labor. The teachings from nature which warranted these conclusions were so plain and well

demonstrated that they seemed facts rather than theories. My first experiment was intended to demonstrate by a galvanometer, used in connection with various kinds of food in the mouth, the variation of the currents generated by different kinds of food. After a long trial, it was found that the same elements used in saliva in the laboratory gave like results. The instrument was laid aside, while the investigations went on. This important lesson was learned: that the instant a current of oral electricity, as generated by food during mastication, is connected with a wire it is converted into physical electricity. By this I mean that when oral electricity leaves the mouth its vital quality disappears. Notwithstanding failure upon this point, the labor had not been in vain. It had distinctly drawn the line of food toleration by nature between organic and inorganic preparations. As above mentioned, the results were the same when tried in the mouth or in the laboratory.

To sum up the teachings of wearing plates, I will mention two points of practical value: First, when a piece of negative metal is immersed in a liquid in which there is a chemical disturbance, the metal is charged with electricity, or becomes one pole of a battery. The current is discharged through the best conductor by the shortest circuit. Gold in any form, for any purpose, worn in the mouth comes under this law. For illustration, a full gold plate covers tissue equal to its surface. No one point is more highly charged than another. The tissue receives the electricity as fast as it is generated, and the gums are not injured by the covering. With gold shell crowns and bridge abutments, conditions are changed. The cement insulates the inner surface; the electrode or electrodes are at the margin of the gums, in connection with the tissue. The majority of work shows the effect of electrified disturbances. Second, gold fillings are also under the same principles mitigated by the following conditions: While all fillings are charged with electricity, as before mentioned, the non-conducting properties of dentin are so inferior to the tissues outside that no perceptible current enters the dentin to disturb calcification; consequently all normally calcified dentin and devitalized dentin is exempt from objection against gold fillings from the electric standpoint. The conditions which come under this influence embody a point in oral electricity that is laid in the foundation principle of recurrent caries in young teeth. All understand that as caries proceeds toward the pulp nature gives warning, and unless the cause is removed the pulp will be exposed. There are rare instances where nature has rendered teeth immune to caries after cavities had been formed. This is evidence that caries is a form of disease connected with neurosis. I do not introduce this theory to oppose in any way the facts obtained from the action of lactic acid associated with micro-organisms.

It will soon be recognized that caries is constitutional and under guidance of life in the body as truly as it is that nature has been so systematic in her work that when we find a cavity in a tooth on one side we clinically examine the corresponding tooth upon the opposite side. Cases of this kind are frequent and convincing. Where saliva flows direct from the ducts in an acid condition, we are satis-

fied that nature directs and controls dental caries within the laws which control the condition with as much exactness and intelligence as is manifested in other diseases.

Here we present an important feature in the agency of gold fillings, wherein they arrest calcification and invite secondary caries around the fillings. As before stated, I will not put this on the electrical basis, where it belongs, but illustrate by thermal changes. This, however, may be said,—that electricity is interconvertible into heat, etc. Physiology teaches the range of heat for animal life to be between freezing and 105° . We have this foundation to build upon, and the following points in practice to demonstrate it: Insert a gold filling into the tooth of a young patient whose teeth are prone to decay, and from that time anything taken into the mouth, as hot food or drink, cold air or ices, exceeding the laws of nature in temperature reverses the normal plan of life energy. The condition or effect upon calcification is the same as it would be without the filling, except the action of microbes. The tissue becomes paralyzed, and receives no more lime-salts. Abnormal thermal changes affect or counteract the functions of the pulp similar to acid in a cavity. There is no fortifying by the pulp against encroachments in either case. Destruction usually proceeds more rapidly with unfilled cavities because of greater exposure to acids, but acids dissolve the lime-salts within or under the gold as well as enlarge the cavity externally.

It has always been stated that gold fillings in the mouth become charged with electricity, especially during mastication of food. It is only when gold is placed in contact with undeveloped dentin that the current does harm. We may call the current heat instead of electricity; either passes into the dentin and reverses nature's current to the undoing, instead of completing, of calcification. I say undoing because the pulp of a tooth performs its work normally by the agency of a negative vital current. Where, by reason of acids,—as in caries caused by heat through metal fillings,—this negative current becomes overpowered, its work is suspended, and in some instances reversed, causing absorption of lime-salts, as seen where large gold fillings which have done good service for years give cause for removal. The usual appearance beneath the filling is absence of lime-salts, the organic matter being filled with a watery fluid, and later the pulp-chamber filled with pus. In the case of young teeth, the dentin gradually turns dark, shading to brown. Removal of the filling shows the lining of the cavity to be soft and devitalized to a depth corresponding to time and conditions. All of these symptoms may be attributed to defective manipulation. Still, these conditions are connected with life in the pulp that operates independently of the environments. Thermal changes acting through metallic fillings convey to the pulp, in effect, reverse action, amounting to absorption, as witnessed upon the roots of deciduous teeth.

In closing this discussion of years, it gives me pleasure to add that personalities have not been indulged in to the disturbance of friendships. History is repeated. In this instance it is antago-

nism between established dental science and evolution, which embraces a phase of science or theory not recognized as science. My faith is grounded upon lessons learned from the book of nature, the authority for all science. The acceptance or rejection depends not upon individuals, but upon evolution into a phase of science recently defined as the "chemistry of organized life." The principles have been preserved until they are gaining clinical recognition, and are knocking at the door for scientific recognition. For this reason, I believe it safe to transfer my contribution to dental literature to the dental profession. Therefore, to my friends and members of the New York Odontological Society, in memory of the sympathy and encouragement so often extended in maintaining the principles involved in teaching evolution in dental science, this work is affectionately dedicated by the writer.

Discussion.

The PRESIDENT. I have the pleasure of introducing Dr. Virgil Coblentz, who is connected with one of our colleges.

Dr. COBLENTZ. Not being versed in dentistry, I will speak only from the chemical, and perhaps the physical, side of the subject. The doctor seems to be very much under electric influences. He, in the start, assumes that vital cell functions are due to electric conditions. I would advise him to read some of the more recent publications by Pflueger, also those of Professor Loew, of Tokio, in which the subject of the vital functions of living protoplasm, the distinction between living and dead cells, is thoroughly discussed. Chemists and physiologists now distinguish between living and dead protoplasm in that the former represents a very labile form of the molecule, while the latter is stable. In such molecules aldehyde and amido groups figure very largely, these being chemically very reactive; they are constantly undergoing changes, breaking up and again reorganizing, giving rise to cell or life energy. So in ascribing these functions to electricity or electric conditions, the doctor is in diametric opposition to the studies and observations of modern physiologists, who have this field entirely to themselves because of the extremely difficult nature of the subject. Chemical analyses or the study of the decomposition products of these living albuminoid substances are of no avail, for the moment the cell dies its structure breaks down, and from the resulting products no one can reconstruct, or even surmise, the arrangement of the intramolecular groupings. Professor Loew has taken up this study in a very ingenious manner, in which he was able to recognize certain chemical groups by adding minute quantities of very toxic substances to solutions containing living cells. He found certain ones which react readily with aldehydes, also amido groups, stop molecular activity, while others did not. In this manner he established the presence of certain organic groups in the living proteid cell.

The doctor is evidently a strong advocate of Berzelius's polarity theory in explaining chemic reactions. Now, this theory has served its time, and has been dropped almost altogether by chemists, for the reason that reactive ability has been found to be governed by the laws of mass action and thermo-chemistry.

Again, the doctor ascribes the taste of coffee to the presence of carbon; that is, the carbon resulting from the roasting process. It is a well-known fact that during the roasting of the bean the fats and soluble matter are converted into pyroligneous products, among which are furfural, amine derivatives, acetic acid, and other complex products, to which the taste of roasted coffee alone is due. In the preparation the infusion of coffee the carbonized matter is left behind as an insoluble mass. The taste of organic compounds, which are all derivatives of carbon, is due to structural differences, and has nothing whatever in common with the carbon present.

If I understood the doctor correctly, he claims that between the gold plate and gums an electrolytic current is generated. It is well known that to generate a galvanic current we must have two different metals, here brought into contact with a fluid containing soluble inorganic matter. However, I cannot understand how the doctor generates a current from one element alone. Thermal currents, if generated during the process of mastication through contact of fillings, would be so exceedingly minute that I doubt their ability to do any harm.

Dr. WM. JARVIE. We are always glad to have Dr. Palmer with us, and to hear him upon this subject, in which he has always had so much interest. The theory promulgated to-night—the electrical theory of decay—is quite different from what has been generally accepted, and yet, looking at it from the clinical standpoint, it appears quite reasonable; and I do not see why—from mere observation rather than scientific knowledge on the subject—decay in teeth may not be from both chemical solution of the lime-salts, caused by bacteria, and by the electrical decomposition of the tooth-substance. In fact, I feel quite firmly convinced in my own mind that it is sometimes from one and sometimes from the other that decay of the teeth is brought about. Perhaps the most interesting point in the paper is the assertion that decay is a disease, and I would like to hear more upon that particular point; whether the essayist considers it is disease in the sense of simply being an abnormal condition,—that is, a departure from the normal,—or whether he means disease as a predisposing condition of the tooth brought about by constitutional causes. I am not at all clear as to what was meant. The paper ought to be discussed by some one who can speak with greater knowledge of chemistry than I can.

THOMAS J. KEENAN (associate editor *American Druggist and Pharmaceutical Record*). Professor Coblenz has carried us as far into the domain of speculation with regard to the theories of organic chemistry as Dr. Palmer has with his electrical theories. While electricity plays a considerable part in chemical action, and our knowledge of the subject is constantly being added to, it is impossible to subscribe to the electrical theory of the causation of dental caries. It is now fairly well established that caries is the result of a primary fermentative process. It is well known to physiological chemists that acids are generated in the mouth through the action of various micro-organisms on particles of food of a starchy nature which have previously undergone some chemi-

cal change by the action of the ferments of the salivary secretion. By the ptyalin of the saliva the starchy elements of food imbedded in the cavities or interstices of the teeth are converted into sugar. A non-pathogenic micro-organism converts this sugar into lactic and other acids which combine with the lime-salts of the teeth, dissolving and removing them. The soft dentin is thus exposed to the invasion of bacteria, which use it as a food-material. The process is thus a parasitico-chemical one, and electricity has nothing whatever to do with it. Dr. Palmer's contention is that the lime-salts are dissolved and absorbed through some electrical force. If this were true, the enamel would be removed from the interior of the tooth or from that part of the tooth in direct contact with the metal forming the filling, but from my reading and observation I learn that caries starts from the outer surfaces and in the interstices or cavities where food particles are deposited, and can develop the chemical changes which are alone responsible for the decay of the teeth. I have listened to the paper with a great deal of interest, but nothing that Dr. Palmer has said has changed in the slightest my belief that the destruction of the enamel of the teeth is caused by acids produced by the action of micro-organisms, which prepare the way for the reception of pathogenic bacteria, which invest the tubules of the dentin, and thus give rise to the conditions known as caries of the teeth.

Dr. GEO. A. MILLS. I want to congratulate the doctor on the presentation of his views, particularly on the subject that Dr. Jarvie speaks of, in reference to disease. I think Dr. Palmer has struck a point we will never get rid of.

Dr. PALMER. I am satisfied with the remarks the gentlemen have made. In regard to the effect on the enamel, I did not mention that to any extent; only I will repeat what I said in regard to the wearing of silver plates with gold clasps, that it will be from one to two years before it will affect the teeth. There is nothing in my paper, that I can recall, that will bring out my electric theories in regard to enamel. The criticisms made are on the plane below where I am operating. We are trying to lead the mind up to the life energy of the pulp. The pulp is influenced when it is depositing lime-salts by any filling that is inserted into the dentin that will cause abnormal changes. We fill teeth when cold and hot drinks affect them for a time, and they get over it; but I do not think many like to fill teeth for children of eight or ten years of age with gold when they can hardly tell where to stop excavating, on account of the resemblance to cartilage rather than bone. The points I stated in the paper are from my experience. I know we will destroy teeth for children unless we conform to nature's plans. I am dealing with the life energy, and that is above our ordinary practice. I do not expect that this will be indorsed here. The time is getting short for me, but it will come around. Neurosis acts upon the pulp. It is inferred by Dr. Black that systemic changes are not the cause of these conditions. Probably you have had patients go to other climates for a year or two and return with a wonderful change,—fillings dropping out, etc. That is a change in vital

energy. I am glad to hear the gentlemen's position, but they are not really speaking to the point I desire to impress upon you. It falls short of the clinical experience which you dentists have, and which causes you to select and adapt your filling to meet certain conditions of the teeth. When one gets the idea and realizes it, he seems to live in a new world. What is said in regard to the mouth is all well enough, so far as any one can know; but you cannot appreciate the way I have obtained this knowledge. I have looked the books over, but get no new light from them. I am learning every day. I have worn a silver plate and an aluminum plate, have two bridges below with considerable gold surface, and I know the effect that no one can know without like experience. When I take carbon in coffee, sugar, etc., I can tell just where nature draws the line between vegetables and minerals. I wish to be excused for seeming to push this doctrine. It is only telling you something that you cannot understand without the experiences. Perhaps I should not have known it had I not been brought to it by wearing these plates. Gold is a positive metal, and when you have other fillings in the mouth,—amalgam or any positive metal filling,—and you wear a pure gold plate, it is the same as putting a platinum plate into a battery. Take out the gold plate and you would not know anything about it; insert it and you establish the action from one jaw to the other. One must be a dentist to understand these conditions, and must have the experience which comes from wearing plates as described.

Dr. JARVIE. Would we get the same effect if we had gold fillings in the mouth and amalgam fillings in a different part of the mouth?

Dr. PALMER. You would get an effect, but not enough to produce any decided result on the taste. I worked three years with the galvanometer to learn that oral electricity, as I call it, cannot touch a metal without being converted into physical electricity, and the reason I am not understood now is that I believe that food is generating electricity in evolution that is manifested in taste, and still higher until it becomes life energy. Polarity is the leading principle. When you oppose an individual and he antagonizes you there is a manifestation of electro-mental evolution that often amounts to a shock. This thing will develop itself. Why I have been so persistent is, I have had the opportunity of knowing by my own experience what no one could learn from laboratory work in that respect. I got my experience from that, by learning from my own case what various kinds of food would do. I went to get assistance from a professor in our university on one of my papers, and he took the same ground that others have taken. He said, "It is impossible; the current you speak of is so minute it could not affect a molecule of water." We understand what nature is doing by vital currents taking up our food and changing it into energy, until it becomes life and mental energy.

Dr. JOHN I. HART. Did I understand you to say that when the pulp is irritated by thermal shock, that that shock will stop the producing of dentin?

Dr. PALMER. It will not at first, but it will if continued. Some teeth of children you can fill with gutta-percha and save them, for there you do not interfere with nature's process; but if you put metallic fillings on too tender dentin the conductivity of the metal is so much more than nature intended that it counteracts nature's current. The dentin turns dark brown around the filling and under the enamel.

Dr. HART. But if you stimulate it you will get secondary dentin.

Dr. PALMER. Yes, but the line must be drawn somewhere, and that line is on the degree of the thermal change that is conveyed to developing dentin. Cold near freezing or heat above 105° is over the normal line.

Dr. JARVIE. Will the doctor give us a word more on the idea that decay was a disease?

Dr. PALMER. I would not like to discuss that far. We all know of the marked effect from certain diseases, and the altered systemic condition from change of food or climate that comes to people in traveling.

Dr. COBLENTZ. I perhaps have done the doctor an injustice in regard to the gold plate. If the teeth were filled with another metal, there might be a current generated.

Dr. FOSSUME. As to the phosphates in nitrogenous food, I have found that in people kept upon a carbonaceous diet the teeth sometimes become very sensitive, especially with children. I have a patient now who suffers from malnutrition due to this condition. Don't you think there will be considerable changes in the electric condition due to that diet?

Dr. PALMER. I have noticed that particularly with children. At the time of examinations, at the close of school, they cannot stand what they do at other times. They are all unstrung, and there is sensitive dentin that would not be sensitive at other times.

Dr. FOSSUME. It is the constitutional condition due to the lack of phosphatic nourishment, which may have been caused by excessive mental strain or excessive physical strain, where the nitrogenous food was not sufficient to supply what was necessary, especially in patients who live upon white bread and various other carbonaceous foods and lack the organized phosphates and nitrogenous foods. Have you observed that?

Dr. PALMER. In systemic treatment, I am satisfied that that occurs.

Dr. FOSSUME. Is it not due to the lack of nourishment?

Dr. PALMER. It is a lack of nourishment that nature supplies. There is a change there.

Dr. RICH. Were you speaking of an absolutely pure gold plate or an alloy plate, in which there are two metals?

Dr. PALMER. I speak of pure gold or platinum as being the most negative metals, or the best plates in a battery to generate the current. In the mouth, an alloyed gold plate would be as objectionable as pure gold, in fact; still, the difference would not be noticed. I have used the term thermal changes because their action is well understood. When "chemistry of organized life" comes to

be recognized, the thermometer will be read differently. One hundred and five degrees will stand high on the scale, while freezing will be near zero.

Dr. O. E. HILL. Sometimes in my life I seem to be placed in a very peculiar condition. For the last twenty-seven years I have made Dr. Palmer very unhappy, but at the same time I have caused many men to think a great deal. Twenty-seven years ago he examined me in dentistry, and he brought up this theory, of which I knew nothing at all. I told him so, and he gave me a sound lecture. Then, when I was on the business committee of the state society, I urged him to bring this before the society. He is very modest, and he has been unhappy ever since. I think he has caused a very great advance in the theory of decay. His papers have set men thinking. He was almost the first man who started these theoretical ideas of decay. I do not think Dr. Palmer disagrees with Miller, do you?

Dr. PALMER. Not at all.

Dr. HILL. Many find fault with that. I do not see it at all. Your idea is the formation of an acid, and Miller's is the same thing. You have another way of getting to heaven than he has. You are all Christians, but you belong to a little different church. While I am sorry for Dr. Palmer, I want to congratulate myself in drawing him out. It has made him unhappy, but it has done good to the rest of us. These gentlemen who have spoken to-night about chemistry know more about it in one minute than most of us know in a lifetime. I undertook to keep up with electricity and Dr. Palmer, but I had to stop it or stop business. I have to take Dr. Palmer's word, and Professor Miller's, and Professor Williams's until I know differently. But I believe they are all right. A great deal of good has come from all the investigation and discussion. I know a great deal more than I would know if it were not for those gentlemen. We are learning a great deal, and I really congratulate myself in throwing you into this furnace, Dr. Palmer, where the fire at times has been very hot for you.

The PRESIDENT. We have all noticed that electric effect when we drink the first mug of beer; but how about the second one, Dr. Palmer?

Dr. PALMER. I have not the experience that some have in that respect, but I think the gentlemen will bear me out in saying that it produces an electric effect or thrill when taken out of a pewter mug; and it is not a disagreeable sensation. If you had a silver plate in your mouth all the time, some of the food would taste as disagreeable as beer from a pewter mug. Taste of many kinds of food is converted into a metallic taste, approaching electricity, so to speak. You cannot decide this question by laboratory experiments.

Nature performs her work on dentin within the enamel. Humor that work accordingly, and you will get the best results. You cannot tell the exact age when a tooth should be filled with gold. Recently I did such work for a child nine years old. It was the best thing for those four teeth. There were pits through the enamel and the dentin was sensitive, but when I came to drill in, it

was in good condition. Another patient might come in with cavities in the incisors,—very soft. In filling such with a conducting material you are impinging upon the vital line. Nature cannot work up to it, as it does to gutta-percha.

Dr. J. H. HANNING. The main idea in Dr. Palmer's paper is the vital principle. He speaks of creation and the vitality of a tooth. The shock and electric action are so great in some cases that they overcome the vitality of the tooth and surrounding structure, and by that means the destruction is caused. It is the lack of resistance in the vital portion of the tooth that causes this decay.

Adjournment.

W. J. TURNER, M.D., D.D.S.,
Editor New York Odontological Society.

UNION MEETING OF THE DISTRICT OF COLUMBIA DENTAL SOCIETY AND THE MARYLAND STATE DENTAL ASSOCIATION.

(Continued from page 1074.)

SECOND DAY—*Evening Session*—continued.

Dr. W. G. FOSTER, Baltimore, Md., read the following paper:

ADMINISTRATION OF NITROUS OXID BY THE HUNTER SYSTEM.

Mr. President and gentlemen,—In presenting this paper for your consideration it is not the writer's intention to go fully into anesthetic lore, but to call attention to, as well as to demonstrate, the present methods of administering nitrous oxid.

It has been the received opinion for a number of years among the prominent men of our profession that in the administration of nitrous oxid it is absolutely essential to exclude all atmospheric air in order to obtain the best results. To do this, large hoods of different kinds were made to cover both nose and mouth. When these hoods were not used, it was thought necessary to compress the nostrils while the mouth-piece was in position so that none of the oxygen could be inhaled.

A few years ago some of our thoughtful men began to experiment with a view to changing this very old-fashioned manner of giving the nitrous oxid, for, with slight modifications, this was the method used in 1844 by Dr. Horace Wells. In speaking of this new system and apparatus (one kind I have with me, and will show you to-night) to a prominent chemist some two months ago, he immediately remarked that he could see nothing unreasonable in thus applying the anesthetic, "for," said he, "we all know that it is the elimination of the oxygen that causes the purplish discoloration so frequently seen upon the face of the patient who is under the influence of nitrous oxid." With the gas administered under the new system, we have no discoloration or stertorous breathing that characterizes the patient. On the contrary, the patient has merely the color that a person would have in natural sleep, and with none of the snoring that usually accompanies administration.

Another advantage is that the patient is not agitated or alarmed by the preparations, as they formerly were by the other method. The mouth is not covered with a hood, but remains open, thus relieving the patient of that dread of suffocation so common to those who take an anesthetic for the first time. We have all seen this struggle, and upon removing the hood have heard the patient remark that they were suffocating. This is partially due to mere nervousness, but more to the insufficient supply of oxygen.

This symptom is not met with in administering gas in the new way. When the patient is seated in the chair, and the cork, or whatever appliance you may use to keep the mouth open, is adjusted, the nose-hood is then placed over the nose, and so retained by a rubber band. The patient is then instructed to breathe naturally, and in so doing breathes also through the mouth, thus relieving the feeling of suffocation and consequent dread. The patient breathing naturally, the gas is now turned on and allowed to pass into the bag in a continuous flow, just enough to be inhaled by the patient. The gas need not be turned off until the operation has been completed, there being no occasion to remove the hood from the nose. In this manner the operator has a much longer time in which to perform the operation, and consequently is less liable to injure the alveolar ridge.

It is claimed that a person may be anesthetized and kept in that condition for ten minutes. I have not gone that far yet, but have increased the period of anesthesia from time to time. The question has frequently been asked, Does not the patient struggle and become excited when about to lose consciousness and before coming thoroughly under the influence? Yes, sometimes, but not in the majority of cases; in fact, comparatively seldom. Again, the question, In that case, what would you do? I should place a napkin over the mouth, and thus reduce the supply of oxygen until the patient ceases to struggle. Some appliances have an arrangement by which one can increase or reduce the amount of oxygen at pleasure. If it is the elimination of oxygen from the blood that causes the objectionable features, why should we not use oxygen to counteract these symptoms, when we know that it does not take away the anesthetic effects of the nitrous oxid?

Before closing this paper, I wish to call your attention to something that has recently come to my notice, and may be of interest to those present. As you are all aware, in the year 1844 Dr. Horace Wells first used nitrous oxid as an anesthetic; September 30, 1846, Dr. Morton, of Boston, used ether; on December 19 a Mr. Robinson, dentist, of London, commenced to extract teeth while the patient was under the influence of ether; in the year 1847, January 19, Sir James N. Simpson was using ether and later in the same year he *announced* the anesthetic properties of chloroform. Now, what I wish especially to call your attention to is the fact that in the same year and near the same time (so far as I can ascertain) that Sir James Simpson announced the anesthetic properties of chloroform it was being experimented with in this city. In the year 1847 Robert Randolph Sams, of South Carolina, then a student

of the Baltimore College of Dental Surgery, volunteered to place himself at the disposal of the faculty of said college to test the properties of the newly discovered chloroform. I have been in correspondence with Dr. Sams, and will read you a copy of his letter to me in response to one I had written him upon the subject:

DR. FOSTER:

Dear Doctor,—Your letter at hand, and although it is almost fifty-three years since that operation was performed, some of the circumstances connected with it are still indelibly impressed on my mind. The first trial was a failure. I remember perfectly the remarks made by the professors, "We will have it all right to-morrow." To-morrow came, and with it the pure chloroform. I took the chair, saying to Dr. Bond, who watched my pulse, "Don't let me go for good." He replied, "I'll look out for that." It seemed to me that it took effect very quickly. When I was recovering from the stupor, one of the students (Albion Martin, of Maine) asked me if I felt it. I said, "I am not a fool." I was vexed and disappointed, feeling that the tooth had not been extracted. He said, "Put your finger in your mouth." As I did so, he showed me the tooth in the forceps. This was in the term of 1847 and 1848. Dr. Chapin Harris administered the chloroform and extracted the tooth; Dr. Thomas Bond watched my pulse; Dr. Handy was the dean. Dr. Cone was also present. I think that if their attention was called to it, that A. Martin, W. H. Morgan, and Harvey Colburn would remember all about it.

Respectfully yours,

R. R. SAMS.

After reading the paper, Dr. Foster demonstrated the use of the apparatus, Dr. George E. Hardy, of Baltimore, consenting to take the anesthetic. The action of the gas was very slow, the patient apparently retaining full consciousness for over two minutes, and coming very quickly from under the effects of the anesthetic.

Discussion.

Dr. J. D. THOMAS, Philadelphia, said that he was specially interested in Dr. Foster's paper and his demonstration, but was disappointed at the apparent result. It had taken two minutes and twenty seconds to bring the patient under the effects of the gas, and he was scarcely anesthetized even at that time.

It is quite possible to anesthetize with nitrous oxid by the usual method of administering the gas without danger of asphyxiation, and it is easily possible to prolong the anesthesia for a much longer time than is necessary for any extraction. He had kept patients under the influence of nitrous oxid for from eight to ten minutes, obliterating the reflexes by the admission of air from time to time. It is demonstrable that it is the proper thing to admit air at proper periods, but you cannot get anesthesia if there is continual admission of air. Some have believed that asphyxia and not anesthesia always results from the administration of nitrous oxid, but it can be demonstrated that anesthesia can be obtained and asphyxia be hindered by the occasional admission of air or oxygen.

An ordinary dental operation, when nitrous oxid is used, will generally be within twenty-five or thirty seconds, and if you can get the confidence of your patients and get them to breathe regularly they will scarcely know when the gas is breathed, and the

whole operation will be over before they know they are even losing consciousness.

Dr. Thomas is opposed to the use of the ordinary face-piece inhaler, because with it it is impossible for the operator to read the signs of trouble in the discoloration of the lips. He therefore uses simply a rubber mouth-piece, with an exhaling valve. He considers it perfectly proper to administer oxygen with nitrous oxid, whether in the shape of pure oxygen from a cylinder or in the form of atmospheric air, but it will inevitably make the operation slower. He was very glad that after the experience the profession has had with local anesthetics, the dentists are generally going back to nitrous oxid, for it seems to be the perfect anesthetic for all ordinary dental operations.

Dr. HARDY said that while the anesthetic was being administered to him he had followed the operation very closely. At first he breathed through his nose entirely, and began to go under the effect of the gas very nicely. He then breathed through his mouth, and the effect went off. He then breathed through his nose again until he went under. He thought Dr. Thomas's remark about the necessity of watching the lips in all operations under anesthetics was true. The lips are the first to show signs of asphyxiation, and to keep them under constant observation is most important.

Dr. W. A. MILLS said he held Dr. Hardy's pulse while the demonstration was going on, and he did not like the symptoms at all. The pulse grew weak, and the surface of the body was growing cold.

In his practice, he uses a face-piece consisting of a hood, and is very well satisfied with it. The symptoms of asphyxiation can be stopped easily by the admission of air. He doubted whether many patients would be able to continue breathing through the nose when anesthesia was approaching, if the mouth were free.

Dr. FOSTER said that in nearly every case the patient can be prevailed upon to breathe through the nose until anesthesia is complete, and in case one should not, a napkin placed over the mouth will interfere with the entrance of air and the end will be gained. Of course, in case a patient cannot breathe through the nose, or will not, the operator will have to use another method.

The subject was passed, and Dr. D. D. SMITH, of Philadelphia, read a paper on "Oral Prophylaxis." Introducing his paper, Dr. Smith said that he believed that the time would come, and perhaps at a not very distant day, when such papers as had just been read will no longer be needed. The time must come when we will do away with all anesthetics in dentistry; when in an ordinary practice there will be no occasion for them. He expects to see that day.

Dr. Smith's paper described the method of prophylaxis which he had practiced for a number of years with increasing satisfaction to himself and his patients. His theory is that a tooth, kept properly clean, is as little liable to decay in the mouth as a tooth that has been extracted. In practice, he has his patients visit his office once a month, or more frequently, when he goes carefully over all the surfaces of each tooth with orange-wood points carrying pumice stone, thoroughly polishing every surface. Then he insists upon a

careful cleansing by the patient twice each day with very stiff tooth-brushes and plenty of powder.

This treatment thoroughly carried out, he believes, will not only render caries impossible, but will also make pyorrhea impossible, will strengthen the attachment of the teeth to the alveolus, preserve the health and beauty of the gums, and, besides all this, will improve the texture of the teeth themselves, rendering the dentin more dense and the enamel harder.

The discussion of Dr. Smith's paper was deferred, and the following paper was read by Dr. RICHARD GRADY, Annapolis, Md.:

MORE EDUCATION—(1) FOR THE DENTIST HIMSELF, AND (2) FOR THE PATIENT.

Two publications received last month suggest my theme. One, the *Saturday Evening Post*, in "Stories of the Studio," written from Paris, in telling what it cost to paint the "great American dentist," says, "It is a full-length portrait, in which the dentist is depicted standing erect looking with an air of pride and professional interest at a tooth he had just extracted." The other, "Our Teeth, How to Take Care of Them," a primer intended for instruction of children in the schoolroom, has for its frontispiece three fiends, one sawing, another drilling, and another chiseling into molar teeth. Is not that repulsive illustration enough to make a child shudder at the thought of a prospective visit to the dentist? "Bugaboos to fright ye."

Now, I protest that neither picture truly represents up-to-date dentistry. On the contrary, the end which dentistry aims to attain is prevention of tooth-extraction and tooth-destruction. The hope of dentistry is to employ prophylactics instead of remedies; to prevent decay instead of treating it. A tendency to conservatism in medicine, surgery, and dentistry is a distinguishing characteristic of the healing art of the present day, and it will be a crowning triumph if a prophylactic method is discovered by which the prevalence of dental disorders may be reduced to the minimum.

Faith in the dentist of the present and of the near future is unbounded as to their action in regard to saving teeth. Everything is promising,—inclination, education, and public taste. Progressive ideas must prevail, and the time is coming when the forceps will be used less frequently. If, as has been said, the real groundwork of national health is education of the masses, so an intelligent comprehension of the varied functions of the mouth and teeth and a better appreciation of the causes of deteriorations and of the means by which they may be counteracted are essential as the groundwork of a much-needed improvement in the dentures of mankind. What has been done in the treatment of zymotic diseases—namely, an improvement in the condition of surroundings—is precisely what is required respecting the teeth. I quote approvingly Lady Aberdeen's remark that, "as a matter of fact, the public health and public good looks are in just as much peril from bad teeth as from small-pox."

Rather than accept the picture which the great American dentist "thought was just lovely" until he received a bill for two hundred dollars, or the picture which adorns the book of "one of the most skillful dentists of the country, enlivened with bright illustrations which children will enjoy," I would prefer going outside of so-called "great American" and "most skillful" dentists and taking the story of General Grant and his tooth-brush; or the story of Colonel Roosevelt and his Rough Riders as they went into the battle of El Caney; or Booker Washington and his two simple civilizers,—“the bath and tooth-brush”; or Dr. Dio Lewis’s message to pupils of a boys’ school, “Pick your teeth” (a message more important, he said, than any great commander could give his men). I say that I would prefer any of these as typical of the dentistry of to-day.

As to General Grant, an officer under him in our Civil War tells the story. “I remember,” said he, “what General Grant took with him in his final six days’ campaign before Vicksburg. He didn’t have an orderly, or a servant, or a horse. He didn’t even have a camp-chest. “Why,” continued the speaker, warming to the subject, “he didn’t even take a clean shirt. I was with him, and I know. General Grant’s entire baggage for those six days was a tooth-brush.”

And as to the Rough Riders, the story is, “All the luggage had to be left behind except the mackintoshes, which protected the men from the heavy rains; but they needed their tooth-brushes so much that they stuck them into their hatbands and carried them in this way rather than go without them.”

Yes, the toothbrush, which in colonial days was accounted merely a superfluity, by no means a necessity, and which “should be considered as a conglomeration of toothpicks and used accordingly,” with the persistent use of floss silk, stands to-day for preventive dentistry. “If it were possible to keep the teeth absolutely clean, there could be no dental caries,” said Dr. Cushing.

Dr. Hart, of San Francisco, who has written on “bacteria of the mouth” and “evolution of decay,” after explaining why perchance a cavity is discovered it may be just a few days after a patient has consulted the dentist and had the tooth pronounced free from cavities that needed fillings, and why fillings and surface cleansing fail in arresting decay, has described a method of sterilization of teeth to arrest and prevent the action of bacteria that cause decay. “By the repetition of this sterilization,” he says, “every three or four months, together with the more careful prophylaxis on the part of the patient, I have been able to arrest and prevent decay in mouths where previous to my efforts at sterilization the teeth were rapidly being lost by decay. The time consumed in putting the teeth in a sterile condition is sure to impress the patient with the importance of antiseptic measures.”

With the wondrous steps that modern dentistry has taken, the increase in our experience of what can and what cannot be effected by operations, with a full appreciation of the great conservative powers of nature, it must be acknowledged that the faithful student who understands the proper use of medicines, and who, being well

versed in all the improvements of the day, can use a moderate degree of dexterity in manipulation, has before him every incentive for encouragement and success. The adage, "Knowledge is power," is emphatically true in the domain of dentistry. He who professes the specialty must possess a knowledge of the improvements, real or fancied, in his science to the very day of his death. He must know that operations which a few years since were deemed totally impracticable can be and are being successfully performed.

It is now considered essential, inasmuch as disease of the teeth is not always a mere local affection, but may, and very generally does, arise from constitutional causes, that the dentist's education should embrace a thorough acquaintance with the anatomical and sympathetic relations of the organs of the mouth with all parts of the system; that he should understand that the welfare of the teeth is ultimately connected with that of the general system, and that he should possess a knowledge of the diseases whose effects may reach these organs.

Cases frequently present themselves in the practice of most dentists in which better results from treatment might be realized if the operator had a better knowledge of the action of internal remedies, and the ability successfully to prescribe for his patients the drugs indicated for their relief. Many lesions of the oral cavity might be as successfully treated by the average dentist were he properly educated as by the practitioner of medicine. And indeed they should be treated by him, for in the practice of his specialty he is not infrequently confronted by neglected conditions of disease not considered of sufficient importance by the patient to necessitate medical care, but which nevertheless have a direct bearing on the success of dental operations and the health of the patient. And, besides this ability to prescribe remedies in such cases, there should be sufficient medical knowledge to enable him to recognize systemic conditions in his patients demanding the care and services of a physician, that he may advise them intelligently and promote not alone their health, but also a sense of reciprocity between dentists and physicians. Since medical men have surrendered the care of the teeth, neither dentists nor physicians know as much about their pathology in a scientific way as they would were all dentists medical men and all medical men dentists.

There is a common ground on which the two should meet, and the tendency of modern education is, I believe, to lead in that direction, as witness the encouragement to the dental departments of our medical schools. It is likely that ere long practitioners devoting themselves to dental surgery will (like oculists, or aurists, or obstetricians, or other physicians or surgeons selecting one branch of practice in preference to another) be at the same time fully qualified medical men. Devotion to a specialty should detract nothing from the position which a man's education and talent entitle him to assume.

We have narrowed our field and separated ourselves from those who should recognize us as co-workers. Dental surgery is a branch of medical science; it is really a specialty in the broader field of

medicine. While this is the truth, which no one who considers it can gainsay, it is practically ignored by the public and by ourselves. At the present time a dentist ranks lower in popular estimation, I think we all must admit, than a physician or surgeon. To-day the dentist stands to the public somewhere between the physician and chiropodist. His social position approaches the former; his professional rank, outside of the lines of legitimate medicine, is nearer than we could wish to the latter. The time has come, it seems to me, for us to take a higher stand, to elevate our specialty.

Let those now entering the ranks of dentistry take warning. No mechanical skill, however scientific; no artistic culture, however perfect, will in the near future rank for anything more than their stamp. Commendable, honorable, remunerative they may be, but they will not long command recognition as entitling their possessor to a place in the ranks of a learned profession.

Dentistry is the science and art of medicine applied to the dental organs. Dentistry, as a true science and art, built upon the foundation of a generous early education, is enlightened by a complete medical course of instruction. Such dentistry will exercise influence and command respect, for it becomes thus a curative work second in importance and extent to no specialty in the great art of healing.

The charge that American dentistry is not scientific should no longer be justified. Instead of literature "replete with statements and arguments based upon mere speculation, with no foundation of fact beyond that constructed in the brain of the originator," and which mislead particularly the younger practitioners, who are ever ready to take up a new idea when brought forward by a prominent man, we should begin to have reports judiciously made, original observations, and scholarly criticisms. These can only be obtained by study, and can only become general with a higher grade of mental and scientific culture than we have hitherto deemed an essential for membership in the dental ranks.

The work of our dental associations is educational in the broadest meaning of the term. All that is modern in practice is elucidated at a meeting like this, and a fountain of knowledge is at the service of members for their professional improvement. But are we, while furnishing a better equipment for the practitioner, encouraging true professional living upon the high plane of right doing? Are we working for the upbuilding and glory of our calling, in honoring which we but honor ourselves?

It is not pleasant to light a candle to show one's defects. I have some reluctance in speaking of things that seem so simple, but, as there are now and then dentists who do not observe them, it may not be amiss to call them to mind here. The Golden Rule works as well in dentistry as in other walks of life. If you have no good to say of another dentist, say nothing at all; but, on the contrary, if there are good things to be said, say them. Your own reputation will not suffer thereby:

Back to thyself is measured well

All thou hast given;

Thy neighbor's wrong is thy present hell,

His bliss thy heaven.

I am sorry to say that the liberality, generosity, and culture which men are accustomed to associate with professional life are not always seen in dentistry. As one of the fraternity well known to you (whose sentiments I fully share) once wrote, "My editorial relationship has impressed upon me many things, but none so vividly as the belief that there is much truth in the old aphorism that men are but children of a larger growth. Men who are otherwise peaceable citizens and generous in material things will quarrel like a pack of hungry curs over a bone when any question of priority or personal credit is involved. It becomes nauseating at times, but I try to forget it and think only of the better side of their natures, and to think of them as charitably as possible."

The dentist is not always just and generous to his brother in the profession. Somehow his vision is limited by the narrow horizon of his special occupation, and he possesses none of that large-minded liberality which is the outgrowth of a generous education. Dentists, the adepts, who are always successful, those who can fill the minutest canal positively to its foramen, and no further, and who are always absolutely sure they have removed every vestige of the pulp, such dentists are very prone when called upon to look over the labors of another practitioner (the average one, say) to assume a grave air of shocked superiority, and state that "if" such and such a thing had been done other and better results would have been attained; that a gross violation of well-known principles has been exhibited, and so on. Whereas it is utterly impossible in the majority of cases, after the patient has received treatment, for one unacquainted with the circumstances and contingencies of the case to express an opinion concerning it. From the point of view of scientific fairness, it is no exaggeration to declare that the wisest dentist is not the one who never makes mistakes, but he who rarely makes the same mistake the second time. The men who say they never err are men who perhaps do not know that they do not tell the truth.

Again, there is a tacit acquiescence in all that a patient may say respecting the practice of a brother dentist which, while it does not commit the listener, yet allows the dissatisfied patient to understand that he is certainly correct in his appreciation of the case. This is the most cowardly and miserable kind of defamation. Far better, and far more honest, is the man who boldly speaks his mind than he who, fearing to commit himself, gives the dissatisfied patient further ground for believing that he has been badly treated and ill-used. In many cases (to quote the code of ethics) the patient is unable to comprehend the operation or service performed, or correctly to estimate its value. Among men of the same profession there is an unavoidable rivalry, as far as they become competitors for the same prize, but in competition there is nothing dishonorable while excellence alone obtains distinction and no advantage is sought by unfair means.

And now, in conclusion, I would say: In all our dealings with patients we should be careful not to injure by hints, inquiries, or any other means the reputation of our ethical brothers, and by these

I mean all who are in good standing in their local organizations, for we can regulate the membership for ourselves so far as science is to be a basis and so far as individual qualification is to be a standard. Make the organizations worth seeking. The public will soon recognize the fact that the man who is willing to measure his ability is the man to tie to. And those who keep outside the organizations will be frowned upon by the general public, which is growing more and more discerning. The dental meeting is necessary both to the individual and to the whole body of practitioners.

Dr. Perry, of New York, says: "Men who receive the benefits arising from membership in a liberal profession assume an obligation to be helpful in that profession as binding as if acknowledged under oath. In no way can they fulfill that obligation better than by active membership in the societies of their profession." And Dr. Meeker, of New Jersey, says: "I believe if there were more dental societies and more members we would see less dental parlors. The general public, of course, does not know as much about dentistry as we do. If it is known that you are taking a prominent part in the dental society your own patients know that you, instead of leading a life of idleness after your professional work is done, are doing something for the good of humanity. You rise higher in the public estimation than you were before."

Discussion.

Dr. C. C. HARRIS, Baltimore, said that the question of the study of medicine as a necessary equipment for the practice of dentistry was an important and far-reaching subject, and that, along certain lines, he had always maintained the necessity for such study; but he did not believe it was advisable for one who intended to become a dentist to spend the time necessary to acquire the medical degree. He had taken the medical course, but it seemed to him now that it would have been better if he had used that time in perfecting himself in dental work, especially mechanics. The greater proficiency in mechanics he might have acquired would have been better both for him and for his patients. The advance in dentistry is so rapid and the demands it makes on the practitioner are so varied that a man who has passed the time required to complete a medical education can scarcely hope to become a successful dentist.

Dr. G. H. CLAUDE, Annapolis, Md., said he did not believe a physician was ever likely to be successful in dentistry, though a man educated first in dentistry may become successful as a physician. Dental operations are so entirely mechanical that the first essentials for success in dentistry are mechanical training and digital expertness. The prophylactic treatment described by Dr. Smith may some time render other dental services unnecessary, but he was not so sanguine about it as Dr. Smith seems to be.

Dr. W. A. MILLS considered the faculties in our best dental schools equal to those in the medical colleges, either in the United States or in Europe, and that the dental student who graduates from one of these schools is as broadly educated as the graduate from the medical school. To be successful in dentistry, he must be so edu-

cated. No man can practice dentistry as he should without a knowledge of the underlying principles of medicine. He need not graduate from a medical college to get this knowledge, but he must get it by study. We are physicians as truly as the medical graduates, because we heal ills that flesh is heir to; and we are constantly called upon to treat cases which cannot be successfully treated without the knowledge of anatomy, pathology, therapeutics, and materia medica upon which medical science is founded.

Dr. WMS. DONNALLY, Washington, D. C., said that Dr. Grady had drawn a pretty picture of dental practice, but it was doubtful whether it was a true picture. No separating line between dentistry and medicine can be laid down. The fundamentals of both are the same, and the dental graduate of to-day has as much education in the foundation sciences of medicine as the medical graduate of twenty years ago had, and besides this he has the special knowledge needed in his special work. It is a most unfortunate thing that at almost every dental meeting some one deprecates the status of dentistry. A man ought to feel proud of his profession, and if he is not, but is jealous of another, he should leave the one he is ashamed of and enter the other. Dentistry is a branch of the medical profession. If it is not, then no other specialty is. A man who treats any part of the human body, alleviates suffering, and restores health is a physician as truly as any holder of an M.D. degree, and there is nothing to be gained by the dental profession by being recognized as belonging to the medical profession. The medical profession has never shown an intelligent comprehension of the function of the dentist, nor of the diseases of the tract that dentists are called on to treat. He asked how many dentists would be better dentists by the possession of the knowledge implied by the M.D. degree.

Dr. L. M. SMITH, Lynn, Mass., said one hundred per cent.

Dr. DONNALLY asked how many men with the M.D. degree are doing better service as dentists than are those who have only the degree of D.D.S. The knowledge of medicine is not what is required of us, but only the possession of the degree. The reason why physicians are unwilling to consult with dentists is frequently because the physician knows so little of dentistry.

Dr. GRADY, in closing the discussion, said the knowledge of the science of dentistry and of how to treat cases that come to him are the only things that can give a dentist a professional standing. Nothing in the way of mechanical ability or aptitude will add anything to this professional standing.

As to the education of the public, professional men are at a great disadvantage. About all the education the people get from dentistry is what goes out from the dental parlors. Those who run these places let the people know what they claim to do, but professional dentists can do nothing of the kind.

On account of the lateness of the hour, the subject was passed,* and convention adjourned to meet next morning.

*NOTE BY DR. GRADY.—It was after 11 P.M. when I was called upon to close the discussion of my paper read May 17, 1901. The late hour was my excuse for not replying at length. Two days later there came to me a

THIRD DAY—*Morning Session.*

The convention was called to order at 10 A.M., and the discussion of Dr. D. D. Smith's paper on "Oral Prophylaxis" was taken up. Dr. Smith demonstrated his method of treatment, Dr. J. D. Thomas, of Philadelphia, being his patient. The treatment consists simply in getting the teeth absolutely clean. He is careful to remove not only the tartar and all accumulation of food *débris*, but particularly to so go over every surface of the teeth as to remove a viscid coat, invisible to the eye, and which is not affected by the use of the tooth-brush. To thus thoroughly clean the teeth, he uses orange wood charged with pumice-stone powder and applied by means of an old-fashioned porte-polisher.

The first patients on whom Dr. Smith used this method were his own grandchildren. He began with them when they were about two years of age, and the results were so good that he felt he must give his patients the benefit of the same practice. Teeth systematically kept clean by this method cannot decay. They will never be affected by pyorrhea, and he is convinced that the production of better tooth-material is stimulated.

He uses the same treatment exactly for pyorrhea. Dr. Thomas was suffering with pyorrhea; he had lost two teeth, and the disease

copy of the May number of the *Dental Review*, in which was published Dr. E. C. Kirk's paper on "The Educational Outlook in Dentistry" and its discussion in Chicago. Some of the remarks are so in accord with what I would like to have said that I quote them as my sentiments. The thoughts expressed by some at the Baltimore meeting may be dimly comprehended in the words of Sam Echols, who was endowed with great ability, but his towering self-conceit exceeded all his other natural gifts. One day he said, "When I think of the strength and wide range of my mental faculties, and the variety of my attainments, I stand back and look upon myself in utter amazement. So far as I can see, I am complete. I can think of nothing that is wanting. I would not give a snap of my finger to add to my present stock of knowledge one more fact or one more accomplishment." When rebuked for his overweening vanity, Sam calmly replied that he was not conceited; he was simply conscious of his own phenomenal powers and acquirements.

Our dentist of limited degree is similarly unconscious of self-conceit, but he is equally sure of his own greatness. In the words of Dr. G. V. I. Brown: "The time has come, it would seem, for the dentist who would be also a surgeon to be one in fact as well as in name,—to have his degree in medicine and also that which certifies to his special training as a dentist. If he chooses to ignore the medical aspect of his calling, then he should, with due regard for consistency, leave out the word surgeon and call himself doctor of dentistry, not doctor of dental surgery or doctor of dental medicine, since he elects to ignore the profession which these terms represent and to be simply the doctor of dentistry; in other words, a teacher of the methods of filling teeth, shorn of the medical, pathologic, bacteriologic, the surgical, and, in short, the entire medico-scientific aspect. The very individuals who so loudly proclaim the fact that a dentist should be distinct from the medical profession, and freely ignore the right to recognition in that direction, would be the very first to protest against the withdrawal of all those portions of the educational and practical branches of his profession which belong by right of fact, custom, priority, and inheritance to the older profession from which they wish to separate themselves. It seems the height of absurdity to speak of the 'passing of the dental college' at the moment when the number of recent graduates eclipses all former records, yet just as the lengthening shadows betoken the

was all through his mouth. There were pockets about some of the teeth so deep that, the ends could scarcely be reached, and by this treatment alone, supplemented by the use of phénol sodique, Dr. Smith was able to relieve the condition; and if the persistent treatment is kept up as frequently as it should be, he feels sure there is no possibility of the return of the disease. The gums will assume a healthy condition and retain the teeth indefinitely.

Dr. J. D. THOMAS said Dr. Smith had been his dentist for a number of years, and frequently scolded him because he did not take better care of his teeth. He lost two from pyorrhea, and had to sacrifice the pulps of two or three others. Dr. Smith finally insisted on this course of treatment, and the change in the condition of his mouth fully justified the experiment. The pyorrhea is cured, the gums and pulps are in as healthy a condition as can be wished, and he is convinced that the very structure of the teeth is improved.

Dr. SMITH, in answer to a question about what special instructions he gave to patients as to the care of the teeth in the intervals between treatments at the office, said the evident thoroughness of the dentist's work will impress the patients with the necessity for greater care on their part. He instructs them, of course, to use quill toothpicks after every meal, and a good tooth-powder on a

coming sunset, so must follow, 'as night the day,' a restoration to medicine unconditionally of her wayward but promising child, dentistry."

These are the words from the Chicago Dental Society: Dr. A. E. Baldwin said, "Like the rest of the members, I have been very much interested in Dr. Kirk's paper and in the future of our profession. I have also been interested in the praise meeting that has been held since. This is the most self-satisfied audience I have ever seen. About the harshest criticism I can make of our specialty to-day, and I say specialty emphatically, is that we are narrow. Whatever we may claim, we cannot escape from the fact that we are engaged in a specialty of medicine. The greatest indication of the narrowness of our specialty is the fact that we are puffed up by the little knowledge we possess, as has been evidenced by the discussion to-night in sandbagging the general medical practitioner because of his general ignorance. How many departments of the human frame does the medical practitioner know a great deal more about than we do? The fact that we are self-satisfied is not, in my opinion, an indication of progress. I tell you, gentlemen, that the thing to do is not to try to feel that the position we occupy is pre-eminently a high one as compared with the other professional men of the world. An eminent educator, in an article on education, said in his peroration that 'a man must know a great deal in order to know how little he knows.' It seems to me from that description we know very little. I do not believe that any man, however insignificant he is, and however insignificant the school he may have obtained his medical degree from may be, is any worse practitioner of our specialty for having the medical degree. On the other hand, I believe anything which teaches us truths about the human frame, about remedies and how to use them, is broadening and beneficial to us in our specialty. I think it would be good grace, and it would show courtesy and intelligence on our part, if we spent our time at meetings in doing something else than in complimenting one another on what we think we know more than the general practitioner."

Dr. Kirk, in closing, said, "I regret very much to see the tendency to draw invidious comparisons between the attainments of the medical practitioner and those of the dental practitioner. . . . I am committed in my mind to the proposition and the belief that dentistry is *de facto* a specialty of medicine."

stiff brush twice a day. The brush should have bristles so cut that the longer ones will go well between the teeth, and the patients should use sufficient powder to fill the brush. Then they must learn to so use it as to reach every surface of every tooth. Some patients will require much more instruction and more insistence on the part of the dentist than others will.

Dr. G. H. CLAUDE, Annapolis, Md., could not subscribe to the theory that all diseases of the teeth were due to their surroundings; in other words, that all diseases of the teeth originate from causes outside of the teeth themselves. Teeth are physiological living organisms, and are subject to disease. Nature certainly intended us to have perfect organs of mastication during life. All of the lower animals living a natural life have them, but the teeth of mankind fail; and the higher the civilization the more apt are the teeth to be imperfect. Nature has provided a mouth constantly washed with an alkaline fluid to overcome the acids produced by the decomposition of food products which would act injuriously on the teeth. If lime-water is placed in a glass and the breath from our lungs is forced through it, there will be a constant deposition of lime-salts. This is what is taking place continually in the mouth. If this deposit is kept from settling about the teeth, they will be in a much more favorable condition than if they are allowed to become coated with it. Then there are serumal deposits which attack the gums about the teeth and, in connection with the calcareous deposits, cause pyorrhea. If all such deposits can be removed and kept from the teeth, no further remedy will be needed.

What, then, about dead teeth? If the pulp of a temporary tooth is dead, the root will not be absorbed, and must be extracted. This proves that the absorption is a physiological process, and not merely a chemical action; so with some of the other manifestations of absorption of tooth-structures. He examined the mouth of a lady a short time ago and found a great many slight depressions on the enamel of the teeth, which the patient said had only recently appeared. He told her that she must be mistaken; they must have always been there, though unnoticed. The depressions continued to increase, however, while she was his patient, and he noticed the erosion taking place around the necks of the teeth. This did not attack the dead teeth as it did the living ones. He was convinced then that it was a waste of material, having a cause within the tooth from a pathological condition. In very old persons, he had seen cases where the teeth undoubtedly got soft, where there was evidently a process of resorption going on. This change does not take place in a devitalized tooth, and, furthermore, the change is an atrophy and not a chemical or mechanical abrasion. The particles of lime are evidently carried off with the circulation in the tooth, in the same way as the roots of temporary teeth are absorbed when the permanent teeth are erupting. These destructive processes he believed would be arrested by the treatment described by Dr. Smith, though he could not follow Dr. Smith in the belief that the treatment would in any degree repair or strengthen the body of the tooth which had been subject to this destructive pathological condition.

On motion, the subject was passed, and Dr. C. W. MITCHELL, Baltimore, read a paper upon "The Effects of Artificial Foods on the Teeth and Bony Structure of Infants."

This was a long and valuable paper, going thoroughly over the whole field of infant feeding, the analyses of different foods, and their effects upon the health, strength, and development of the child. His conclusions were, in short, that nothing would satisfactorily take the place of the mother's milk, but the best substitute was fresh cow's milk modified according to the age of the child. All artificial foods are lacking in some element, and though in many cases the appearance of the child gives no indication that it is not being properly nourished, still the absence of these essential elements will inevitably show an evil effect as the child develops. Infantile scurvy is the consequence also of improper feeding, the greater number of cases being chargeable to the use of some of the proprietary foods so largely advertised; and the cure of this disease can usually be accomplished by changing the food to cow's milk that is fresh,—that is, that has not passed through the separator and is not sterilized,—properly modified by the addition of cream, water, and milk sugar.

We regret that we cannot give the readers of the DENTAL COSMOS the paper in full, because, though not strictly pertaining to dentistry, the subject is one often brought to the attention of dentists, and is of vital importance. It was discussed by Dr. C. J. Grieves and Dr. W. A. Mills. At the conclusion of their remarks, the convention passed a vote of thanks to Dr. Mitchell for the paper and adjourned.

FIRST DISTRICT DENTAL SOCIETY OF THE STATE OF NEW YORK.

THE First District Dental Society of the State of New York held a regular monthly meeting Tuesday evening, February 12, 1901, at the New York Academy of Medicine, No. 17 West Forty-third street; the president, Dr. William C. Deane, in the chair.

INCIDENTS OF OFFICE PRACTICE.

Dr. F. L. STANTON. I have brought this dental sterilizer to show you. There is nothing original about it. It is simply the Schering sterilizer reduced in size, using the Schering lamp and formaldehyd gas.

Dr. NASH. Will Dr. Stanton explain the process of sterilization, and the length of time that the pastils take to consume?

Dr. STANTON. The lamp there will extinguish itself in ten minutes. Formaldehyd gas will be generated in four minutes, but the instruments are to be left there for ten minutes. They are wiped and placed in the chamber. That is a sufficient length of time, according to all the authorities. It will neither destroy any fabric nor injure or stain any instrument in any way. Mouth-mirrors, fine broaches, and everything go in.

Dr. TRACY. Sometimes the formaldehyd makes the broaches brittle. Are there any fumes?

Dr. STANTON. It is gas-tight as it stands. If you do not like the fumes, you simply remove the little screw-top in an adjacent room; but it will pass away in a few minutes. If you object to it, it can be taken into another room. That is why the screw-top is there.

Dr. GOLDSMITH. I had a case present itself which I think is of unusual interest, although not infrequent enough to be called rare. Dr. Kirk has recently cited some similar cases. A girl of fifteen presented herself with what I thought was an alveolar abscess. It was a lower right first molar, and the gum was tumefied as it would be with an abscess. I lanced the gum, found pus, and then opened into the tooth, thinking I had a dead pulp to treat. There was pus in the pulp-chamber, and I naturally concluded the pulp was dead. The girl winced so much, however, that I made a more careful examination, and found I had a vital pulp with which to contend. I was afraid to put in arsenic the first day I treated it, as I feared the gum was exposed at the bifurcation; but on the second day, finding such was not the case, I applied the arsenic, and when the patient returned the abscess had disappeared. No vestige of it was left. I then removed the pulp, and proceeded as usual.

Dr. HENRY D. HATCH, the essayist of the evening, then read his paper, entitled

SOME PRACTICAL SUGGESTIONS IN MINOR ORAL SURGERY, WITH BEARINGS ON THE EDUCATIONAL PROBLEM.

One of the objects of this paper is to lend a helping hand to some who are feeling their way through the maze that surrounds the field of surgery lying between the filling or extracting of a tooth and those larger operations which require hospital advantages, such as removal of the jaws, excision of the tongue, etc.

While speaking with a prominent member of this society concerning the procurement of material for our "oral surgery" clinics held this winter, the question was asked, "What is oral surgery?" The jocular answer was, "Anything we don't do."

Now, we believe that the dentist or stomatologist, it matters not what we call him, the one who has charge of the thirty-two teeth, or less, in the mouth, should also care for the tissues around the teeth, above the teeth, and beneath the teeth. If the present system of dental education be not sufficient to qualify him to do so effectually, then the system should be changed or enlarged. We have seen a patient left in a dental chair with a tooth hanging to a piece of broken process and torn gum while the dentist who had tried to extract it went across the street to get a doctor. In a case of alveolar abscess a physician wanted to treat the outside of the face while I treated the inside.

"Too many cooks spoil the broth." One doctor is enough at a time. Either turn the case over to a surgeon in its entirety or treat it yourself and take all the responsibility. Learn the clinical aspect of malignant growths, and when a suspicious one presents make a section of it and send to a good pathologist for a microscopical examination. That is the only correct course, as a few

weeks in a pathological laboratory can fit no one to speak authoritatively of a suspected tissue.

In making the section, it is well to remove some of the surrounding healthy tissue with it, and also to go deeply if the periosteum or bone is involved. If the tumor be a small one, remove the whole tumor, as it will be none too large for convenient handling; then, if it should prove to be benign, no further operation will be necessary. Place the piece into three per cent. formalin, afterward into five per cent. If the pathologist should report it to be malignant, the case may be given to a surgeon or dealt with as may seem best. The author is of the opinion, however, that malignant growths are best dealt with by a general surgeon or oral specialist who operates at a hospital, as such growths ought either to be let alone or very thoroughly removed.

To return to some of the more minor surgery, such as is not usually given in books.

First, the treatment of badly torn flaps of gum, occurring during extracting. We have seen the whole tuberosity of the maxilla, including the wall of the antrum, torn away with the third molar imbedded in it. Such an accident may easily happen to any dentist operating on an aged patient, when the antral wall is thin, for there is a progressive thinning of all the sinuses as age advances.

A similar accident has happened to me several times, except that when the fracture of the tuberosity was felt the operation was stopped short and with the Parmly-Brown or other strong chisel the tooth was pried out of the loose piece of bone, the bone being held by the fingers as best it might. The tooth once free, the fragment was replaced and stitched to the adjoining tissue, using for the purpose the smallest curved needles. Such pieces tend to unite very quickly, an antiseptic wash being used in the meantime. In this way all large pieces of gum accidentally torn while extracting are not cut off, leaving the process bare, but are stitched in place or otherwise retained.

Another call for minor surgery is in case of obstinate nerve pain after extracting. If the pain is severe and continuous, resisting the action of anodynes or antiseptics, it is presumably caused by the pinching of nerve filaments in the bone surrounding the socket; at least, such a diagnosis has seemed to be verified in several cases in practice, where the pain ceased at once and forever upon cutting the bone at the apex of the socket with a sharp, round, rapid-running bur.

In doing this operation we are of course to bear in mind the antrum on the one hand and the inferior dental vessels on the other, although if the antrum be perforated with a clean, sharp instrument under the usual antiseptic precautions no harm will follow. One such case came to me where an upper third molar had been extracted and the patient, a man about forty, had suffered severe pain from the time of extraction. There was no laceration or unusual appearance. No application of drugs gave any relief. The case was operated upon as outlined above, giving instant and

permanent relief from pain. Care was taken for the antrum, but in this case the bone was so thin that the antrum was perforated. No treatment was addressed to the antrum except to pack the tooth-socket in its lower third only, leaving the opening in the antral floor to fill in with granulations, which it did in a few days.

Another case of nerve compression by bone—this by growth of root cementum, and not by traumatism—was that of Mrs. C., a lady of about forty-five years, who applied for relief from intense and persistent pain located above the molar teeth on the left side. To make a long story short, the three molar teeth were extracted. As you will see by the specimen shown, the teeth are nearly sound as to crowns, but the roots present an unusual case of hypercementosis. The pain was only slightly relieved by extraction. The bone was probed—not with a blunt instrument, but with a sharp, stiff one—and found to be unlike the normal process, in that it presented to the probe a dense, smooth surface instead of the usual porous one. In this case, I reasoned that the bone surrounding the roots had been rendered compact by the growth on the roots, thereby impinging upon the nerve filaments; therefore the whole of this dense layer of bone was removed by a sharp bur. This time the antrum was not perforated. The patient received instant and permanent relief from a long-standing, continuous pain which had become almost unendurable.

Another procedure in minor surgery of the mouth, seldom practiced and we believe only once mentioned in the literature, is the removal of abnormally large alveolar processes in edentulous jaws, for appearance sake, in those cases where no teeth could be adjusted that would not protrude too far. The alveolar process is a functionless tissue after the teeth are lost, and if it does not absorb sufficiently to allow of placing a decent-looking artificial denture, then its removal, in whole or in part, is a permissible operation. Dissect back the gum and periosteum as far as required, and with a cross-cut fissure bur or a small chisel and mallet cut away the desired amount of osseous tissue. Syringe out the detritus, put in a stitch or two, prescribe an antiseptic wash, and the case will probably heal better and quicker than we are accustomed to see after the use of, say, alveolar forceps in extracting.

Another operation proposed by the author is the removal of those bony growths that occur at the suture of the palate bones and palatal processes. These growths sometimes render the wearing of an artificial denture almost if not quite an impossibility. [Specimens shown.] These growths, which ought to have a definite name, we will term interpalatal hyperostoses. They are always benign in character, and usually occur in middle or advanced life. The patients are usually unaware of their presence, unless their attention has been called to them by a dentist or physician. But to the prosthetic dentist they are a terror, especially to the “*always and never*” man, who always puts in an air-chamber and never (in these cases) gets a fit.

The operation proposed is that of making a crucial incision, dissecting back the muco-periosteum and removing the bone by cut-

ting forceps or engine burs, then replacing the soft parts by sutures after trimming off enough to allow of their easy coaptation. If by any accident the bone should be cut through into the nasal cavity, a cleft palate need not result, as the union of the soft parts with bone-producing periosteum would be all-sufficient.

Bone Surgery.—Perhaps the most frequent lesion we are called upon to treat, and one which we can hardly avoid treating if we do anything with abscessed teeth, is caries of bone; necrosis may also present, but many cases of caries will present to one of necrosis.

If the young practitioner will do his own extracting, instead of sending it to a specialist, he will be in the way to learn many things he otherwise might never know. First, he may learn the feel of normal bone and process by examining the bone immediately after extraction, using the same strong, sharp, nearly straight excavator used in examining for caries or necrosis. By carefully examining the teeth extracted, he may learn much as to size and shape of roots; and by grinding, something of supposedly "perfect" root-fillings. Also much as to the extent of chronic abscesses, diseased bone, etc. When caries is present, our attention will first be called to it by the tumefied condition of the soft parts overlying the bone, such parts looking nearly purple, with usually more than one fistula. The pain in these cases is usually one of a dull, grinding, persistent character. Then, if we have familiarized ourselves with the feel of normal bone (and normal bone varies much in different individuals), we can easily note the difference between that and the soft or porous feel of carious bone.

Treatment of Carious Bone.—If the sulfuric acid treatment is to be tried, and well it may be, its retention in contact with the bone is important. Strong solutions may be used, as the soft tissues are not destroyed by it on account of the alkalinity of the blood. The acid has an affinity for the dead bone, and stimulates the living; it also acts as an antiseptic.

If, after using the acid treatment, operation is decided upon, first make the parts aseptic, not by one washing only, but by several days of treatment. The dead bone is to be removed by an engine bur or a curette, as the case or the skill of the operator may determine. The author has found that the largest round burs sold for cutting dentin cut better than some of the ones sold for bone-cutting. The bone-curettes sold at the surgical instrument houses are usually found too large; the smallest one is for mastoid work. Again, we have fallen back on the large-sized dental excavators of the rapid-cutting "spoon" form, the straight handle being preferred if the case admits; or the smallest Kingsley vulcanite scraper may be used.

When surgeons scrape away carious bone it is called "curetting," but when dentists scrape away carious dentin it is called "excavating," a term which reminds one of public works, digging for sewers, etc. The term ought to be dropped; a dental excavator is a "curette," and with it we curette the dentin.

The operation of curetting, once commenced, should be done

thoroughly, following the dead bone wherever it leads, even if it lead us somewhat out of our field. An operation commenced in the canine region once led the author into the inferior turbinated bone as well as the antral walls.

General anesthesia is indicated in these cases, as cocain seems to do no good in the osseous tissue, and without anesthesia the operation is generally unsatisfactory and incomplete. Nitrous oxid gas is too transient to allow of thorough, careful work of this kind.

Last year the Committee on Practice of the State Society corresponded with men of eminence in this and other countries. The most striking feature of the replies was the almost universal use in dental surgery of the old-fashioned and much-decried carbolic acid. And so, in oral surgery, the drug in which we have the most faith is the old-fashioned and much-decried iodoform. The powder is mixed with listerine to form a cream, which is used incorporated with gauze or cotton as a light packing. Iodoform and carbolic acid are anesthetic as well as antiseptic.

When a wound in the mouth looks badly, grows larger rather than smaller, giving the patient pain, an application of iodoform as above described will generally allay the pain at once and will change the character of the wound to one of healthy granulations inside of twenty-four hours. Aristol as an odorless substitute has never in my hands quite come up to the more disagreeable iodoform in these respects.

If a deep cavity has been made by operation, avoid using any powder too freely, and wash out frequently, or the wound will heal as a cavity and not fill up level with granulations, as it otherwise might. Packing, if done at all, should be done *very loosely*, unless we desire to push the soft parts back to gain access to deeper tissues. By too vigorous packing a wound can not only be kept from healing, but may be *extended* indefinitely.

While the mucous membrane of the maxillary sinus cannot be handled too carefully or stimulated too little, wounds involving the gums and alveolar processes frequently need stimulating, either by drugs or by the curette. Of the former, the capsicum and myrrh of Garretson is still used. A sharp curette is used lightly over the surface, not enough to destroy the granulations, but simply to freshen them and to remove the whitish film which frequently presents in this tissue.

Another important use of the sharp curette is to remove the mucous membrane from the edges of a wound where it is desirable to keep it granulating until a space has been bridged or a depression filled up, as instance a gap in the hard palate from operation or otherwise. If left to itself, the mucous membrane, whose cells proliferate more rapidly than those of the deeper tissues, will grow over the edges of the wound, causing it to heal, leaving a gap or cleft.

A Plea for Antisepsis.—Some years ago, during a discussion on the use of the surgical engine in brain surgery, Dr. W. W. Keen, one of America's best surgeons, and since that time president of the American Medical Association, said that he did not use the

surgical engine for opening the brain-case, as he had not had the long training necessary for its successful use, and that he could not trust dentists to do it because they did not understand antiseptis. Such a remark from such a man is humiliating to our pride, and ought to serve as a stimulus to greater endeavor toward a more thorough knowledge and practice of antiseptis.

There has lately been taken up in this country what has for some time been done in Europe,—viz, the putting in of prosthetic pieces to replace the loss of more or less jawbone immediately after the removal of the bone. Now, such work, if done at all, must be done by practical dentists, working *with* the surgeon. Some of us would have to brush up a good deal before we would be tolerated around the operating table of a modern hospital.

The chief benefit to be derived from such surgical clinics as we have had this winter is the viewing of modern antiseptic methods. Let us glance at a few of the slips in asepsis which may happen in even a well-regulated dental office,—one where the instruments are sterilized between patients, etc.

First, the hand-piece, with its diamond pattern on the sheath, has just been handled while operating for other patients,—not only touched by our fingers, but it may have been in contact with the patient's mucous membrane. Could not the manufacturer supply us with several sheaths fitted to the same hand-piece, so that they could be slipped off and boiled with the other instruments?

Then there is the rubber-dam face-piece, made of rubber elastic and ivory, that has been used for everybody since it came from the depot.

Then there are the various wooden-handled instruments still made by the dealers and bought by dentists.

There is the wire brush used to clean out the vile impacted matter from the burs while operating, and often fastened to the engine and used the season through without removing.

We turn on the water with soiled hands, and, after cleansing them, turn it off with the same hands! Faucets should be made to work with the foot.

There are the corundum stones, which always get wet with the saliva and sometimes blood, and which cannot be boiled, or soaked long in carbolic solution, or in bichlorid (on account of the steel shanks), but they can be treated to formaldehyd, either as gas or liquid.

Then there are the drinking-glasses; a modern chair is provided with *one* only. We should provide ourselves with enough to last all day, and at night have the whole lot cleaned thoroughly and put on a clean tray for next day's use.

The mouth-mirrors are also difficult to cleanse, especially when they have wooden handles.

All of which points to the use of formaldehyd gas as the best if not the only method of sterilizing all of our instruments and appliances. Boiling for five minutes in water with bicarbonate of soda added, where the instruments can be boiled, is undoubtedly a good and scientific method. Burning off with alcohol is unscientific and impracticable.

Besides our instruments, there are our hands, which once rendered aseptic should be kept so.

Let the office attendant make change. Keep the pocket-knife out of the pocket. Refrain from handling anything except the instruments concerned in the operation.

Complete asepsis is, we fear, well-nigh impossible in a modern dental office, but we hope to see the day when, as suggested by a Russian dentist, the filth-laden draperies will be torn down, the disease-breeding carpet thrown out, and the plush-covered chair abandoned; when, clothed in white, we shall operate in a white room with everything in it boiled or boilable. Such surroundings not only insure immunity from infection, but tend to inspire confidence on the part of the patient and self-respect on the part of the operator.

Bearings on the Educational Problem.—Add to the operations mentioned above several others, such as two of Dr. Angle's,—viz, first, the removal of the mass of tissue lying between widely separated centrals to facilitate drawing them together and to assure their retention; second, the section of the peridental membrane to facilitate rotation.

Also that measure, practiced by some, of removing the germs of permanent teeth to anticipate overcrowding.

Also Dr. Talbot's operation of removing sections of osseous tissue to facilitate the movement of resistant teeth.

The treatment of maxillary fractures or dislocations, for which the dentist is eminently fitted.

The hunt for and removal of impacted or encysted teeth, which may be found almost anywhere in either jaw, and which may cause any amount of trouble without their dental origin being suspected.

The operation of alveolotomy, with amputation of the whole or part of the tooth-root.

These, together with the operation of transplantation, replantation, implantation, the treatment of and various operations for pyorrhea alveolaris so called, and operations upon the antrum of Highmore, form quite an array of operations in minor oral surgery which are plainly within the province of the dental surgeon of to-day.

Fifty, or even thirty, years ago such a proposition would have been ridiculed. Fifteen years ago at a dental meeting the author overheard an old-time dentist complaining because "They were introducing so much surgery into dentistry that he could not understand much of it." The "surgery" complained of was nothing more than a talk by Dr. Barrett on the gross pathology and treatment of alveolar abscess.

Whither are we tending? Plainly toward that mother profession from which we should never have been separated.

We have cited a few only of the many operations which serve to connect us with surgery. Space does not permit speaking of the many bearings which general medicine has upon our work and our work upon general medicine. But suffice it to say that he who in his dental work disregards the syphilitic taint or the mercurial im-

pression; who treats lymphatic and nervous, anemic and plethoric, alike; who disregards the states of puberty or pregnancy, or who fails to detect the action and reaction between the teeth upon which he operates and the general nervous and circulatory systems fails to grasp the height and breadth of his calling, and fails to serve humanity as he otherwise might do.

Let us, then, abandon the D.D.S. and the numerous other titles and degrees which all mean the same thing, and go back to that world-renowned and time-honored degree of M.D., shared by all the specialists of medicine except ourselves.

Then we would be "recognized" in any country or any hospital. We would not have to explain when called "doctor" that we were *only* dentists.

Our prescriptions would then be honored at the drug-store, our death certificates received by the proper authorities, and we would stand on the same level as the ophthalmologist or rhinologist, practicing, in name as well as in fact, an intricate and important specialty.

Discussion.

Dr. ROBERT T. MORRIS. There are so many things to say in this connection that it is difficult to present them concisely. At the time of receiving Dr. Hatch's invitation to discuss his paper, saying that he was to propose that dentists graduate as physicians, I was called to Albany to discuss the Bell bill. Last Wednesday we had, at Albany, in the Assembly Chamber, one thousand people,—three or four hundred of whom were Christian scientists, a number of osteopaths, somatologists, esoteric vibrationists, Dowieites, clairvoyants, and magnetic healers,—all asking to be admitted to practice on a footing with physicians, most of them being unwilling even to pass the Regents' examination which is required of physicians in order that they may begin the study of the practice of medicine. I thought of Dr. Hatch's note. It seemed to me, in the presence of that vast audience of a struggling multitude of men who were asking to be admitted to practice on a footing with physicians, that first we should consider the dentists,—the oral surgeons. This is a matter which appeals to me very strongly. I believe that you should all graduate in medicine first, and then practice what you please afterward. A favorite theme with me for some time has been the establishment of a department in oral surgery at the Post-Graduate Medical College, and the time is coming, when we shall have larger funds, when I shall again urge, as I have previously done, the development of this very important part of our course.

Dentistry and oral surgery to-day comprise a sum-total of knowledge which should not be taught, I believe, in a special dental college. I believe that, for the full comprehension of the subject, men must be thoroughly grounded in the principles of surgery in which general surgeons are grounded before we are allowed to practice surgery. I believe you should all be graduates in medicine first; then develop this specialty of medicine. So much more can be accomplished than is accomplished to-day. I find, in traveling about the country, dentists who are familiar with a very wide range

of subjects in general surgery, but who are hampered by a lack of knowledge which they have a right to possess. I have also found surgeons well equipped in principles who know so little about oral surgery that they allow cases to go by default and permit an unnecessary amount of suffering. I confess to the feeling myself of a great need for more knowledge in this field. In my clinical work, in my surgical practice, I feel that I have not always done the best thing for the patient. He may not have been referred by me to the proper authority, the proper oral surgeon, the proper dentist. I am willing to know—if this course were a necessary part in our curriculum, I should know—what other surgeons should know in the field of oral surgery. Let me quote a few specific instances.

Last year I had occasion to see in a Western city a man with a hard swelling of the floor of the mouth, extending to the hyoid bone, edema of the glottis, neuralgia of the laryngeal nerves, and a condition of rapid general depression of health,—a man of great business affairs failing in health. Several very prominent surgeons had been called to see the case. He was a man who could afford to have the best of talent. Some had taken cultures from this hard swelling of the neck and had discovered—nothing. Some had made sections, and had discovered—nothing. Meanwhile the patient was getting worse all the time. I saw him and believed that he had a superficial necrosis of the bone, due to an old pyorrhea, and that this lymphatitis, as I diagnosed it, was secondary to that. I had the patient brought to New York with great difficulty, and turned him over to Dr. G. Lenox Curtis. Dr. Curtis found the diagnosis was correct. It was too late. The patient died a day or so after his arrival. The patient could have been saved if he had gone to a dentist instead of going to prominent surgeons. He had too much money; he called in too great talent. That man of large affairs, a prominent business man, with a young, growing family, is dead because he went not to the dentist, whom he should have seen, but to prominent surgeons. That is one specific instance. I see many of them,—I am merely quoting one by way of illustration.

On the other hand, I have recently seen a case in which a dentist had advised a patient to have several teeth extracted because of an intense neuralgia. He suspected that there might be some disease of the roots of the teeth,—I am not familiar with the technical designation. Anyway, the patient had an intractable, severe neuralgia, and the dentist advised him to have several teeth removed. I saw the patient, found evidences of eye-strain in the different elevations of the eyebrows,—a sign with which we are familiar,—referred the case to an ophthalmologist, and the patient was immediately cured of this hitherto intractable neuralgia. It was neuralgia dependent upon eye-strain, with marked demonstration at the terminal filaments of the fifth nerve; so it seemed as though the teeth were at fault. Here was a case where several teeth would have been sacrificed, and the difficulty would never have been discovered had she remained in the hands of a dentist. Here is one case where surgeons failed; here is another case where the dentist

failed. Two important patients, who should have had the benefit of the knowledge of to-day; but they did not find that benefit readily, because we are not taught from a common source upon a common basis of principles.

I do not know the practical result of the implantation of teeth. It seems to me that surgeons could have told dentists in advance that it would not be a success, because we have found that animal substances when engrafted would be absorbed. We have even used ivory to replace the head of the hip bone, and the ivory has become absorbed. By analogy, we could fairly anticipate that the implantation of teeth would not be a success. I am sorry I did not ask some one on this point before coming here, because it may be that the principle does not work out this way in this application; but we might have averted useless work that the dentist may be doing if it was generally known that ivory and bone would be absorbed,—knowledge that we surgeons possessed long before the implantation of teeth was tried.

Not long ago a dentist proposed to do some work for a patient of mine, stating he would give her a little chloroform. He proposed to do the work while she was sitting erect in the dental chair. Now, I presume there is not a man in this room who would have done that, and yet this was one of the older and most respected dentists, with a fashionable *clientèle*, and this was one of his most influential and important patients. This ought not to be; such things ought to be impossible, even if men are behind the times. They ought to be taught at your society meetings,—it ought to be well known that most chloroform deaths occur under just those circumstances. Even the men who are most behind the times ought to be familiar with the fact that a little chloroform is a dangerous thing, while much chloroform is safe if the patient is recumbent.

I am a good deal disturbed in referring patients with suppurative gingivitis or pyorrhea alveolaris to dentists. Some dentists claim they cure the cases; others say they are not curable. I know some dentists cure some cases. That I know because they have cured cases of mine that other dentists said could not be cured. I want to know which dentists can cure these cases for me. I want to know in what class of cases they are going to cure, so we may have our knowledge upon scientific ground,—so there may not be this speculation and uncertainty. Physicians are dealing with these cases all the time.

During the month of November, I think, I removed three lower jaws for complications resulting from the extraction of teeth. I have not the slightest idea that any one of the dentists who removed the teeth knows to-day that those jaws were removed. We do not see the final results of each other's work. One of those cases was for actinomycosis, and one for cancer following a fracture of a fragment of bone when a tooth was removed; another was entire separation of the periosteum from burrowing of pus after fracture of a small fragment of the inferior maxilla. It was after these cases passed out of the dentist's hands, after the teeth had been extracted and it was supposed that they were no longer cases for the dentist, that the more serious complications appeared.

This is wrong. These patients should be taught that they are still to be kept under the charge of the dentist; the dentist should be taught to know what is to be done with these cases. You do know, —I assume in making this form of statement that most of this audience know,—but some dentists do not, and these cases drift on from bad to worse. We see cases in which teeth have been removed while there is abscess of the tooth in an acute progressive stage. When the abscess is forming, the bacteria are in a state of active proliferation,—very active development. If a very small fragment of bone is broken, the veins of the cancellous structure of the bone fill with thrombi, which become infected.

Dentists do not see the patients who die in hospitals of septic pneumonia; the death certificate says "pneumonia," and no more is known. But those of us who trace it from the original history find many a case that goes on to desperate conditions because of the removal of a tooth, because the bacteria at its root were in a state of active proliferation. In most cases where abscess is progressing at the end of a root, I believe the fluid collection of pus becomes sterile in a few days because the bacteria, walled in by phagocytes, pour out so much toxin that they commit suicide with it, and then it is safe to do anything with the tooth. But while the bacteria are progressing and developing rapidly we must know that these cases are dangerous ones; we must handle them with the greatest caution. Yet I have seen many a case coming in with violent inflammation. I saw a patient about two weeks ago with violent streptococcus infection coming from the extraction of a tooth. My impression is the patient died shortly afterward. It was a case sent to the hospital as a case of erysipelas. The patient was almost moribund. It would have gone down in the death statistics of this city as erysipelas. Nothing more would have been heard of it if I had not been sufficiently interested in the matter of oral surgery to ask if she had had anything done to her teeth, and learned that she had had an ulcerated tooth removed, and this erysipelas followed. Dentists would have known nothing about it, and physicians would have known nothing about it excepting that it was a case of erysipelas. When we are all graduated from the same college, when we all work from a common basis of principles, then we shall have better records of such case-histories.

Not long ago I myself had occasion to have a tooth removed. I was referred to an expert in this city, and he put between my teeth before extracting the tooth a wooden prop that I know to a moral certainty had been in the mouths of people with tuberculosis, in the mouths of people with syphilis. I know because of the age of the mouth-prop. There is no reasonable doubt but that it had been in the mouths of a good many patients with syphilis and tuberculosis, and perhaps diphtheria cases. In the beginning of diphtheria, the teeth often commence to ache, and patients go to dentists with the bacteria of diphtheria most actively under way. I presume the prop is still in use. I know it had been in use for months. It is not right that an expert in this city should have used that mouth-prop for any one,—even upon a surgeon!

I meant to mention incidentally that there are many cases now cared for by the general surgeon which belong to the oral surgeon,—cases of fracture of the jaw, for instance, which belong regularly to the oral surgeon. I believe he is by all means best fitted to care for them. I formerly cared for a good many. I have had some good results, and some very unsatisfactory ones. Cases of cleft palate I do not know about referring. I operate upon some of them, and I send some to oral surgeons. Sometimes I see wonderful obturators. I see some so made that the patient speaks perfectly, and one would not know that there was a cleft in the palate. I see other cases, no worse, in which the dentists tell me nothing can be done. Now, this is a point upon which you ought not to be disagreed. You ought to have common knowledge upon the subject. I ought not to have to spend my time and go to a great amount of trouble and inquiry in order to find out which men know about these cases. It ought to be a matter of common knowledge, accessible to all of us who want to do the best thing for our patients. I want to refer my patients to the best man. I do not want to refer them to a dentist because he is a friend of mine, or because he looks neat, or because he has a fashionable *clientèle*. I want to refer them to the best man, and that knowledge ought to be common.

As to the matter of antisepsis. This is often neglected by dentists. I wish to have it understood that the present company is always excepted, but I do say that antisepsis is neglected. I go into offices where the instruments are not boiled or sterilized by the alcohol flame, and no attempt is made at sterilization. I know to a certainty that those instruments have been in tuberculous mouths. I know they have been in syphilitic mouths. If the tuberculosis does not appear at the gum, dentists may say, "We have not carried any infection into that patient's gum." If he comes to me with tuberculous glands, it would require a very close questioning to carry that case back to the original source of infection; but these infections do occur. None of us are agreed upon the common knowledge which we should have upon the subject. You cannot use dental instruments upon a series of patients without directly inoculating and infecting some patient with something. It cannot be avoided without antisepsis. There are too many bacteria that go from one patient to another. Let us say you carry nothing worse than streptococci and staphylococci. In one patient whose cells are very resisting, the streptococci are never active. That patient carries streptococci, but his protoplasm is sufficiently resistant, and they never make headway. Transplant those streptococci to another resisting patient, and they do not make much headway. On the other hand, transfer streptococci from a case of pyorrhea,—mild, if you please, in which resistance has not been made, in which the streptococci are developing rapidly,—transfer some of those to the strongest, healthiest individual, and they have a headway which nothing can control, and your healthiest patient may go on six months later to have a pyorrhea which he never would have had on earth if your instruments had been boiled. Boiling with soda in

the water will prevent rusting. The instruments will not tarnish, the edges will not be spoiled. I boil my most delicate needles and knives in water with bicarbonate of soda, and it prevents injury to the edge. I am sure this can be applied to most dental instruments. The sterilizing with formalin that Dr. Hatch has spoken of I am not familiar with for instruments, because mine are all boiled or subjected to dry heat or passed through an alcohol flame.

Dr. Hatch spoke of iodoform and aristol as antiseptics of the mouth. Neither is a direct antiseptic; both act like antiseptics by destroying toxins—ptomains—with their free iodine. By destroying ptomains they remove the irritating element in the infection, so that bacteria do not make such headway; while not directly antiseptics, they act like antiseptics in removing the irritating elements. Iodoform is soothing and locally anesthetic. Aristol has this peculiar physical characteristic, that it sheds water; and if we wish to prevent burrowing of pus, or burrowing of fluids, if the cavity is dried and a film of aristol is placed all about the tissue no further burrowing can occur, because the aristol repels water; it has that physical characteristic of repulsion to fluids.

Hydrogen peroxid has not been spoken of here. That, it seems to me, ought to be one of the best antiseptics for use in oral surgery, because it is a very searching, destructive agent,—destructive to the media in which the bacteria are growing. The peroxid is an immensely valuable agent, but very harmful in the presence of granulations; do not forget that. Many surgeons do not know it, but we can keep a sinus open indefinitely with peroxid because it attacks granulations; and nature must fill the sinus by building up a very dense tissue at great labor. A sinus which would naturally heal very quickly as soon as the granulations are well formed can be kept open for months by the improper use of this most valuable of resources.

There are so many points to be discussed that I do not dare bring up more than these few salient ones that have suggested themselves to me while Dr. Hatch was reading his paper.

Dr. GOLDSMITH. Anything that emphasizes the necessity for the practice of asepsis in dental surgery in as able a manner as this paper has should be especially praised. There are some things that the last speaker said, in regard to indorsing the idea of having dentists obtain the medical degree, which I also commend. I think every practicing dentist ought to be graduated an M.D. first. As to whether practicing dentists ought not to have something further besides that to entitle them to practice I think is a mooted point which permits of considerable discussion, because, while we know there are lots of dentists who are not competent to practice, we know there are also a lot of physicians to whom the same criticism would apply; and it offers an inducement to the unsuccessful practitioner of medicine to practice dentistry if all he needs is to hang up his shingle, so to speak.

The question of dentists carrying infection and setting up a pneumonia from the premature extraction of a tooth is something I have never heard advanced before, possibly because I have not

read sufficiently ; but I have always contended that when extraction was decided upon, the time to extract was then and there ; and in the case the doctor cited, of actinomycosis, I would like to inquire for information whether that could have been inoculated by the dentist.

Dr. Morris spoke also of cases of cleft palate. After the most beautiful exhibition of Dr. Brophy before the New York Odontological Society last month, and the work of Dr. Kingsley and others in the same line, I think that dentists can rather flatter themselves upon having brought forth in that particular specialty most of the best scientific work which has been done.

Then, again, as to the question of disagreement in the curing of pyorrhea cases. It is true dentists do disagree. Some dentists do cure cases of pyorrhea that other dentists say are incurable. I venture to say that the same dentist will meet lots of cases which he will find incurable. But doctors of medicine have been known to disagree, and I think dental doctors have the same right.

The question of asepsis is the main point in this paper. I do not think dentists practice aseptically nearly as much as they should, with all that has been said on the subject. Dental offices as a class are improving, but there is still much room for improvement. I should like to ask most of the dentists present how often they change the cover of the operating table. I know it is often put on in the morning (frequently not even then) and kept on during the remainder of the day. It is generally a napkin, made of an absorbent material, and the instruments used on each patient, although carefully sterilized previously, are thrown upon the cover only to be infected by what may be remaining. The cover should not remain after each patient, and in my office, to make that inexpensive, I have had my table covered with glass, and as each patient comes in clean white sterilized paper is put on, which, when the patient is finished, is taken off by my assistant with the instruments in it and taken into a little laboratory I have adjoining my office.

Dr. HART. Dr. Morris cited a case in practice where pneumonia was possibly caused by careless extraction of an abscessed tooth. I would ask if the diplococcus of pneumonia, being the same as we find in the alveolar abscess, might not have been carried through the circulation instead of by means of the gastro-pneumonic tract?

Dr. MORRIS. I will first reply to Dr. Goldsmith. The dentist was in no way responsible for the actinomycosis, but I think he should have recognized the character of the disease and destroyed it at once with his pure carbolic acid, or any method he pleased. It was not the dentist's fault. It was the patient's fault, but my point is that the dentist should not have discharged him until it was well.

Dr. GOLDSMITH. Are these cases of actinomycosis so frequent as to require, or rather expect, their diagnosis by a dentist? Are they always diagnosed by medical men?

Dr. MORRIS. No ; I think not. But they have certain characteristics that are pretty well marked, and they should be recognized.

After one has seen two or three he should recognize them regularly, although he may not have known the first one. It is not very common. Most of the cases have been reported from Europe. Dr. James Israel, of Berlin, is perhaps the best authority on this subject, and has collected perhaps more full statistics than any one else; but with the "Index Medicus" one can find a large number of cases of actinomycosis reported from America, and the disease is often overlooked.

We know the great advance in surgery of the mouth has been made by oral surgeons, but we do not know which men are the ones to whom to send our patients, because it is not a matter of common knowledge in the medical profession, as it would be if we had graduated together from the same college.

Dentists have a right to disagree. Physicians do disagree, and the errors and troubles from such disagreements make us particularly sensitive. We want the other fellows to be all right.

In answer to Dr. Hart: The pneumonias following septic infection are apt to be streptococcus pneumonias, or the diplococci may follow as a terminal infection, the streptococci having less activity in some cases. Diplococci, which are practically always present, are able to increase as a terminal infection.

Dr. DEANE. Dr. Goldsmith alluded to the operation for cleft palate that Dr. Brophy performs ten days after birth.

Dr. MORRIS. That is an extremely important point. I did not know of Dr. Brophy's work, but undoubtedly should know about it. I shall look up the literature on the subject.

Dr. HATCH. When reading my paper I noted the point that Dr. Stanton and myself had had no mutual understanding whereby he brought this formaldehyd sterilizer to illustrate my paper. In the same way, Dr. Robert Morris knew nothing of my paper except the title, and that I was going to advocate the degree of M.D. being held in common.

There is one thing that Dr. Morris said that I have thought of many times, and that is the point that we do not see the final results of each other's work. If we did, we would be in a way to understand a great many things that we misunderstand at present. A dentist goes on with what he calls a successful practice year after year, and sets down in his own mind certain methods and operations as being successes, and sometimes brings them before dental meetings as being such. If he had some way of knowing the final results of all these cases, it would be better for him and for the patient. Not only is this so as between dentist and physician, but it is so as between dentist and dentist. If we had more brotherly feelings, and met together oftener and talked things over a little more honestly, it would be better for all of us.

Dr. Morris spoke of hydrogen peroxid not being mentioned. That was an oversight. It is used by me almost as freely as water. I do not use it much as a post-operative drug, for the reason he suggested, that it will retard granulations. When I want a wound to heal, and granulations have started, I do not use the peroxid; but to clean up the field before commencing an operation, dental or

otherwise, especially a pyorrhea alveolaris operation, it is the first thing I lay my hands on, as well as in cases where I find pus or organic matter.

The question of what degree we should have is a mooted one. A whole symposium was devoted to the subject at Atlantic City last year at the American Medical Association. I will not dwell long upon the subject, but some of you may ask me why I, who am only a D.D.S. (and an M.D.S., which is practically the same thing), should stand here and advocate the acquirement of the M.D. I will tell you why. It is because I have seen the need of it. I realize the need of it more every day that I practice. An up-to-date dentist, call himself what he may, is practicing a specialty of medicine,—the great art of healing; and if he is doing that, it is time that he flocked with the regular medical men and took the regular M.D. degree. The sciences of chemistry, materia medica, physiology, etc., can hardly be taught as well in a small dental college as in a large medical school. I want to call your attention for one moment to the reverse side of the question. Suppose the medical specialties, of which there are many—some one has said that the umbilicus is the only part of the body that has not been made a specialty of—would each start a separate school for its specialty, and take a separate degree, as we have taken. What kind of a muss would we be in? How would the poor traveler on the street, who saw a lot of letters after a man's name, know where to go for his stomach-ache, or where to go to have his nose treated? And how would the little separate schools compare with the large medical colleges of to-day?

Dr. Goldsmith said we needed the degree of M.D. and something afterward. The ophthalmologist, after getting his M.D. degree, needs something further, and he acquires it; but he has only the degree of M.D. Just how it is to be acquired or obtained I do not know, but I am certain that a man who had been thoroughly grounded in a medical school, and whose mind was thoroughly trained, could take hold of the purely technical part of our work and master the details in a short time, as compared with the present method, where students have to bother with technicalities and fine manipulations at the same time that they are trying to acquire a knowledge of physiology, anatomy, and other purely medical subjects.

Dr. MORRIS. I would like to make this point in this connection: It seems to me it would be a comparatively easy matter for dentists to acquire special knowledge after they had acquired the general principles at the medical college. Let me make this comparison: If a man knows English and studies German for three years, he can learn Norwegian in three months. If he knows English it will take him three years to acquire Norwegian, and he cannot acquire German in less than another three years. That is a comparison I would make. Because having his English and his German, his etymology is so ready for his roots that he acquires Norwegian at once. That is a comparison which I think would be carried out here. A man devoting the usual length of time preparing himself

for medicine can then, in a few months, prepare himself for the technical work of the dentist, because he is so grounded in the principles. This may not be strictly true, but the suggestion is one that appeals to me, and one which it seems is worthy of further development if this matter is to be brought up for further discussion.

Adjourned.

B. C. NASH, *Secretary*.

THE HARTFORD DENTAL SOCIETY.

AT the annual meeting of the Hartford Dental Society, held Monday evening, October 14, the following officers were elected: James McManus, president; J. Warren Harper, vice-president; Edward Eberle, secretary; Ernest R. Whitford, treasurer. Executive Committee—Nelson J. Goodwin, chairman; George O. McLean, and Elmer B. Abbey. Librarian, Albert E. Cary.

EDWARD EBERLE, *Sec'y*.

DENTAL SOCIETY ANNOUNCEMENTS.

COLORADO STATE BOARD OF DENTAL EXAMINERS.

THE Board of Dental Examiners of the state of Colorado will meet in Denver, Col., Tuesday, December 3, 1901, at 9 A.M., for examination of applicants for license to practice dentistry in Colorado. In addition to written and oral examination, applicants must supply their own patients, instruments, and materials, and come prepared to do practical work under the supervision of the board, which will pass upon suitable selection of cavities. All applications must be completed prior to December 3d.

For application blanks and information, address

H. F. HOFFMAN, *Sec'y*,
611 California Bldg., Denver, Col.

VERMONT BOARD OF DENTAL EXAMINERS.

A MEETING of the Vermont Board of Dental Examiners will be held at the Pavilion Hotel, Montpelier, Wednesday, December 11, 1901, at 2 P.M., for the examination of candidates to practice dentistry. The examinations will be in writing and include anatomy, physiology, bacteriology, chemistry, metallurgy, pathology, therapeutics, surgery, materia medica, anesthesia, operative and prosthetic dentistry, together with an operation in the mouth. Candidates must come prepared with instruments, rubber dam, and gold.

Applications, together with the fee (ten dollars), must be filed with the secretary on or before December 1st.

GEORGE F. CHENEY, *Sec'y*,
St. Johnsbury, Vt.

OHIO STATE DENTAL SOCIETY.

THE thirty-sixth annual meeting of the Ohio State Dental Society will be held at the Great Southern Hotel, Columbus, Ohio, December 3, 4, and 5, 1901.

S. D. RUGGLES, *Sec'y.*

MASSACHUSETTS BOARD OF REGISTRATION IN DENTISTRY.

A MEETING of the Massachusetts Board of Registration in Dentistry, for the examination of candidates, will be held in Boston, Mass., November 13, 14, and 15, 1901.

Candidates who have applied for examination will report to the secretary, Wednesday, November 13th, at 9.30 A.M., at Tufts College Dental Infirmary, corner Huntington and Rogers avenues, and come prepared with rubber dam, gold, and instruments, to demonstrate their skill in operative dentistry. Any one who wishes may bring his patient. So far as possible patients will be furnished. The board in every instance selects the cavity to be filled. Partially prepared cavities never accepted.

The theoretic examination—written—will include operative dentistry, prosthetic dentistry, crown- and bridge-work, orthodontia, anatomy, histology, surgery, pathology, materia medica, therapeutics, physiology, bacteriology, anesthesia, chemistry, and metallurgy, and will be held at Civil Service Rooms, State House, from Thursday, November 14th, at 9.30 A.M., until Friday P.M., November 15th.

All applications, together with the fee of twenty dollars, must be filed with the secretary of the board on or before November 6th, as no application for this meeting will be received after that date.

Every candidate for examination must be twenty-one years of age.

Application blanks may be obtained from the secretary.

Candidates who have taken an examination, and failed, and desire to come before the board again at this meeting are not required to fill out a second application blank, but must notify the secretary as above in order to be examined. The fee for third and subsequent examinations is five dollars.

G. E. MITCHELL, D.D.S., *Secretary*,
25 Merrimack st., Haverhill, Mass.

PENNSYLVANIA BOARD OF DENTAL EXAMINERS.

THE Board of Dental Examiners of Pennsylvania will conduct examinations simultaneously in Philadelphia and Pittsburg December 16-19, 1901. Apply to the Hon. James W. Latta, secretary of the Dental Council, Harrisburg, Pa., for information and papers.

G. W. KLUMP, *Sec'y.*

EDITORIAL.

THE INEVITABLE TREND IN THE PROBLEM OF DENTAL
EDUCATION.

As promised in our previous issue, we publish in this the address by Sir Michael Foster, delivered before the International Dental Federation at its meeting in Cambridge, Eng., August 7, 1901.

We think it will be generally conceded that if the principles which form the basis of the plan suggested by Sir Michael Foster are not altogether new, they present at least one novel feature,—viz, the clear, virile manner and courageous spirit in which he disregards old precedents and strikes out boldly into a new field, erecting a standard for dental education which is unhampered by traditions of the past and which is based squarely upon the merits of the issue. From its beginning in the struggle for a professional existence, dentistry has been swayed to and fro by the consideration of its medical relationship. It has been called an independent profession, and it has been called a specialty of medicine. The intricacies of the problem involving its status have been so great that not only in America, but throughout the world, opposing views have been and are still held as to the relation which the practitioner of dentistry should bear to medicine, and a corresponding difference of opinion has naturally arisen as to how the dentist shall be educated.

A mere accident determined the creation of the first dental school in the world upon a basis of organization separate and distinct from medical educational institutions. In other countries, notably England, circumstances brought about an organic affiliation with the medical profession, with the result that both methods have been tried extensively, and in the process of evolution many of the defects in the educational workings of these two systems have been corrected. But this same evolutionary process with its concomitant correction of defects has done something more: it has brought about a condition of affairs, both in medical and in dental education, where it has become evident that only a certain group of studies are necessary for the education of the dentist, as, in like manner, only a certain group of studies are necessary for the education of the medical practitioner; and, furthermore, that many of the studies included in the medical curriculum are of but secondary or of little importance, just as many of the studies in the dental curriculum are of little or no importance to the medical practitioner. It has brought us to a period when such a view of

dental education as is set forth in the address of Sir Michael Foster is possible. We have reached a point where we can realize that in order to make a dentist it is no more necessary to begin by making a physician of him than it would be necessary to begin by making a theologian of him. We have come to appreciate, with regard to dental education, the necessity for an adaptation of means to ends,—that in order to make a dentist we should begin to make a dentist of him from the beginning.

We have discovered, as has been very wisely said by Dr. Brophy, that the scientific studies of chemistry, anatomy, physiology, bacteriology, etc., are not medicine, but sciences which are utilized in the training of the medical practitioner, and they are likewise sciences which are utilized in the training of the dental practitioner. And when the question is asked, "Is dentistry a specialty of medicine?" we can say that it is, in so far as the term medicine is meant to include all that may be properly included in the great healing art. But in regarding the dentist as a medical specialist we do not mean that it is therefore necessary that he should, in order to be trained as a medical specialist, be compelled to study all of the subjects which enter into the formation of that curriculum at the end of which the medical degree is conferred. We mean that he has been trained, or should be trained, in such of the sciences fundamental to the healing art as are necessary to make of him an intelligent and efficient practitioner of dentistry. The whole subject has been beclouded by a lack of precise understanding of the meaning of the terms employed,—*e.g.*, medicine, medical science, specialty of medicine, etc.

With the addition of a fourth year to the dental curriculum, as recently agreed upon by the National Association of Dental Faculties, the time required, the extent of study involved, and the nature of the branches taught will place the dental curriculum on an educational par with that now required in America for attaining the medical degree; but when we come to view the equipment of the dentist under the new curriculum, with respect to the thoroughness of his training, it becomes evident that, in view of its object, the training afforded by the dental curriculum will be more thorough than that afforded by the medical curriculum, for the simple reason that in the former case the whole of the curriculum is directed toward the training of a practitioner in a single department of the healing art, whereas in the same length of time the medical curriculum professes to equip a man for the practice of all departments of the healing art,—a feat which both in practice and in theory is impossible; because of which we take it that the

educational principle laid down in Sir Michael Foster's address will in the near future be as definitely applied to all branches of medical training as it has been applied to dentistry.

The growth of this question, which has culminated in such a presentation as is embodied in Sir Michael Foster's address, marks an era in the development of the whole question of medical education, using that designation in its broadest sense.

In the light of the present situation, the heated exhibition of emotion made by the editor of *La Revue de Stomatologie*, Dr. Cruet, Ancien Interne des Hôpitaux de Paris, Dentiste de l'Hôpital de la Charité, etc., is of more than passing interest. He is evidently a believer in the aphorism, "When you have no case, abuse your opponent." In the September number of his journal he takes occasion to express his feelings in a series of criticisms upon those of his *confrères* who differ with him in opinion as to the education of the dentist. For the benefit of those who may not be informed upon the subject, we will state that in France, as well as elsewhere, the dental profession contains practitioners who have on the one hand received their training in separate dental schools, and those who, in addition to their dental education, have had the training of the physician and possess the medical degree. The first are the *chirurgiens-dentistes*, and the other the *dentistes-medecins*. A few dentists holding the medical degree participated in the Third International Dental Congress, held in Paris in August of last year. Dr. Cruet says of these latter that

"They do not represent French medical opinion, nor the opinion of the *dentistes-medecins*, as the majority of these have for a long time been working in absolutely different directions. I do not know what our honorable *confrères* represent, but what I am justified in stating, judging from their past work, is that they attend those meetings only for the purpose of defending the doctrine of the uselessness of the medical degree, or, in fact, of medical knowledge for the dentist. It can be said that they constitute in a philosophical or natural order a species which is about to disappear, a sort of physiological paradox intermediate between the old dental world and the new, to which they have not known how to adapt themselves. Between the ancient species and the new, which is more highly developed through evolution, the intermediate types provided with such fantastical organs that they resemble nobody still subsist. They should be attentively observed and classified while there is time, for soon they will have disappeared. However, they will not die before going through blustering convulsions."

We fear that, in his anxiety to condemn his *confrères*, Dr. Cruet has written his own epitaph. We have attentively studied the report of the Third International Congress, and we fail to find anywhere an expression by any one which could be tortured into a

claim as to the uselessness of medical knowledge for the dentist. We are quite well aware that several strong arguments were put forth as to the uselessness of requiring a dental student to take the medical degree before studying dentistry. Dr. Cruet will have to hear with better ears than we have, or see with better eyes, in order to adduce one fact in support of his erroneous statement above referred to. The position which he has assumed is one which for many years was defended and advocated by his illustrious editorial predecessor, Magitôt, but, in spite of the herculean efforts of that savant and many who labored with him, and in spite of the efforts of propagandists of the same mistaken theory in other countries, the practical fact remains that the medical curriculum as now constituted is not regarded, by those who have a right to know, as the best means for attaining an education in dentistry.

The dental curriculum has steadily progressed in the evolutionary scale, and is producing better practitioners of dentistry than can be made by any such abortive plan as is advocated by Dr. Cruet and the minority who think with him. He holds that the creation of a separate school for dental education in France under the medical law of 1892 was brought about from the fact that dental prosthesis was not taught in the medical schools, so that it became necessary to create special teaching facilities for prosthesis; but he holds further that by the working out of this plan prosthesis has not made any progress, and that the creation of a separate dental school has not contributed to the making of better dentists, but that, on the contrary,

"The only thing that it has done has been to lower the standard of prosthesis, which in time will have to be turned over to professional laboratories from whence it should never have come out." "The truth is that the schools are powerless to make good mechanics,—they are hardly able to make beginners, and those coming out knowing something about mechanical dentistry do not usually become general practitioners, and the rare and limited number of dentists that make their own mechanical work are detestable dentists and inferior mechanics."

Pretty nearly everybody knows that that statement is not true,—unless Dr. Cruet has in mind some dental institution with whose product we are not familiar. His whole attitude evinces that kind of professional vanity which is so often a by-product of the dento-medical combination, a union which begets neither a good physician nor an efficient dentist. If he were really a first-class mechanic, he would evince more respect for the work of the mechanic and have more pride in his attainments. If he will carefully review the question of dental education from the broad view-point of Sir

Michael Foster's address, and squarely consider just how much of medical training he has found to be useful in dental practice, and at the same time decide how much additional dental training would be really useful to him as a practitioner, his views on the subject of how to properly educate dentists will, we doubt not, undergo radical changes; or if, again, he will consider the proposition from a statistical point of view, and endeavor to offer a satisfactory explanation as to why it is that the views for which he contends are shared by such a contracted constituency, whereas the whole trend of the dental educational movement is undoubtedly toward distinct and special training upon a separate basis, we think his later conclusions will be more in accordance with the facts as they are.

AN ANCIENT MEDICAL WORK.

THROUGH the kindness of Dr. Alban V. Elliott, of Florence, Italy, we have received a copy of the medical writings of Aulus Cornelius Celsus, a physician of great learning and a devoted student and follower of Hippocrates, born at Rome in the reign of the Emperor Augustus, at the beginning of the Christian era. Celsus is said to have written many books, of which the only one that has been preserved to our day is a volume on Medicine, written with great purity and clearness of style in Latin. The copy found by Dr. Elliott is one of the third printed edition of Celsus' work on Medicine, published at Padua in 1750. The volume contains also a portion of the medical writings of Q. Serenus Samonicus, who died at the beginning of the third century, and of whom little is known.

At pages 380, 381, and 382, Celsus describes certain remedies against toothache, concerning which disorder he says that "it may be justly ranked even amongst the greatest torments," and for its relief recommends abstinence from the use of wine, and also at the beginning no food is to be taken, and later only sparingly and then of a soft character lest the teeth be irritated by chewing. Then the steam of hot water is to be applied externally by means of a sponge, and a cerate of cyprine or iris oil spread upon wool, and the head must also be covered. If the pain be more severe, a clyster is to be used, with hot cataplasms applied to the cheek, as also some hot medicinal liquor held in the mouth and frequently changed, for which purpose is used a decoction of cinquefoil root in diluted wine, and henbane root either in vinegar or diluted wine, with the addition of a little salt to either of them, and poppy-heads

not over dry and mandrake root prepared in the same manner. But in these three care must be taken not to swallow what is in the mouth."

Applications of hot oil on a probe wrapped in wool were recommended to be made directly to the tooth, likewise applications of a compound made of the inner shell of an acid and dry pomegranate powdered and mixed with an equal quantity of galls and pure bark, and with these is mixed minium, which being powdered are brought to a consistence with rain-water, or panaces, poppy-tears, hog's fennel, stavesacre without its seeds, powdered in equal proportions, or three parts galbanum and a fourth of poppy-tears. Pepper, pellitory, cardamoms, frankincense, figs, elaterium, mustard, sissile alum, crude sulfur, bitumen, and bay berries were among the remedies prescribed for various kinds of toothache.

For loosening a tooth so that it might the more readily be extracted, "the prickle of the planus fish, called by the Greeks trygon, is toasted, then powdered and mixed with resin, which being put around the tooth loosens it."

Careful directions are given for the extraction of teeth by the forceps, and it is recommended in the case of hollow teeth to fill up the cavity with lint or lead well adapted to it, lest it break under the forceps.

The ligation of loose teeth with gold wire to those that are firm, and the use of astringent washes, are advocated. It is extremely interesting to note the large number of dental operations and methods which at that early date were understood and practiced, and that many of the principles of treatment then only empirically used have survived in modified form through the intervening nineteen centuries.

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INTERROGATIONS ON DENTAL METALLURGY. Covering in Outline the Lectures and Laboratory Work in the Course of Dental Metallurgy at the Pittsburg Dental College. By J. H. BEAL, Sc.D., etc., Professor of Chemistry and Metallurgy at the Pittsburg Dental College. Pittsburg, Pa.: The Calumet Publishing Company, 1901.

This is a quiz compend without answers to the questions propounded, a feature which the author believes will be found valuable as an aid in teaching, in that it will impel the student to search for and frame intelligent answers instead of memorizing those already

framed for him. If it will help to study rather than memorizing it will constitute a notable improvement upon the ordinary quiz compend.

DENTAL MEDICINE: A MANUAL OF DENTAL MATERIA MEDICA AND THERAPEUTICS. By FERDINAND J. S. GORGAS, A.M., M.D., D.D.S. Seventh Edition, revised and enlarged. Philadelphia: P. Blakiston's Son & Co., 1901. Price, cloth, \$4 net.

The sixth edition of this standard work appeared in 1895, at which time we called attention to certain errors and inaccuracies in the hope that they would be eliminated, but several of these errors still remain. Prof. James Truman's method of combining arsenic with iodoform for pulp devitalization is still credited to "Dr. Charles Truman," a nonentity. Reference to the use of arsenous acid for obtunding hypersensitive dentin is still continued, and the statement that the action of zinc chlorid on dentin is superficial has not been corrected. For the benefit of the reviser of the next edition, we desire to state that there is no such person as Dr. Charles Truman; that the use of arsenic as a dentinal obtundent is an abomination, and that zinc chlorid does penetrate the dentin. We will also add that the Fahrenheit boiling-point of water is 212°, and not 202°, as given at page 71; that "healthy pus" (p. 126) is a relic of antiquity and a contradiction of terms; that Dr. Brothers, who says (p. 149) "dentition is rarely if ever a direct cause of death," is wrong; that a ten per cent. solution of boric acid (p. 211) cannot be made with water, as boric acid is soluble in not less than twenty-five parts of water, and that sulfuric ether is an antiquated and scientifically obsolete term.

The present edition contains much that is new and valuable in the way of additions, rendering it more acceptable as a hand-book for students and practitioners, and making it altogether the best work we have on the subject of which it treats. Those who have found satisfaction in the use of former editions of this book will derive gratification from the many improvements which are to be found in the latest.

ORAL SURGERY: A TEXT-BOOK ON GENERAL MEDICINE AND SURGERY AS APPLIED TO DENTISTRY. By STEWART LEROY McCURDY, A.M., M.D., Professor of Anatomy and Surgery, Pittsburgh Dental College, etc. Pittsburgh, Pa.: The Calumet Publishing Company, 1901.

The scope and classification of subjects embraced in this work are excellent, and show an intelligent comprehension of the needs of

the dental surgeon in a work of this character. It is, on the whole, a good book,—we might say a very good book but for certain crudities, omissions, errors, and bad proof-reading, which mar its value to no inconsiderable degree. The following loose statement certainly cannot pass unquestioned:

“Bacteria multiply at the rate of one per hour, while the process of leucocytosis and karyokinesis requires from three to four hours. This disproportion between cell and bacterial multiplication gives the bacteria the ascendancy when once an area has been thoroughly conquered. The bacteria attack the cells and leucocytes and destroy them, or in some instances the leucocytes swallow up and destroy the bacteria, stopping sporulation. When a leucocyte is entered by a bacterium, it becomes a phagocyte.”

The meaning of the author is reasonably clear to any one conversant with bacterial pathology, but for the teaching of a student the statements quoted are confusing in the extreme.

The author's conception of the term leucocyte is somewhat peculiar. He says, “It must be remembered that the *leucocyte*, which was a white blood-corpuscle before it left the cavity of the bloodvessel, does not repair tissue, but that its function is that of a scavenger or carrier of waste and broken-down tissue from the field of repair back into the circulation.” We are of opinion that its position, whether inside or outside the bloodvessel, does not make the cell under consideration either more or less than a leucocyte, and probably neither more nor less a *phagocyte*, which is probably what the author meant to describe as the character of the leucocyte after its diapedesis in cases of irritation or inflammation.

Symbiosis is defined as a “mixed infection,” which is taking liberties with a technical term having an entirely different signification.

The distinctions drawn between “sapremia” and “septicemia” are vague and badly stated.

Etiology is defined as “*the cause or causes which precipitate the onset of disease*” [italics ours]. Evidently the author has confused the causes of disease with the study of the causes of disease.

The formula given (p. 71) for Schleich's cocain solution is an example of bad prescription-writing, being a heterogeneous mixture of English and bad Latin thrown together without regard to accepted form.

Less than a page is given to the consideration of nitrous oxid as an anesthetic. A book intended for the use of dentists should treat this important feature more in detail.

Cataphoresis is treated as the use of local anesthetics introduced

into the cavity of a tooth by the electric current,—a definition not sufficiently comprehensive.

The causes of catarrhal stomatitis are stated to be “some mechanical or chemical irritation from decayed or neglected teeth.”

The book contains no description of Brophy’s important operation for the radical cure of cleft palate in adults, and no mention of the surgical engine in cranial operations, for removal of tumors, neurectomy, etc.

These are some of the defects which need correction to bring the work up to modern standards and make it acceptable as a reliable text-book for students. The prevalence of misspelled terms is inexcusable, and should have been avoided by more careful proof-reading.

Notwithstanding the points of criticism above noted, the work is admirable in its plan and general mode of treatment, and in a corrected form would satisfactorily meet a general desire for a good text-book on oral surgery for use in dental college teaching.

OBITUARY.

DR. CHARLES E. ESTERLY.

DIED, September 10, 1901, of cerebral hemorrhage, after a very brief illness, Dr. CHARLES E. ESTERLY, of Lawrence, Kan.

Dr. Esterly was thirty-eight years of age, having been born July 5, 1863, at Columbiana, Ohio. His father was Mr. Geo. Esterly, now of Massillon, Ohio. Young Esterly graduated from the high school in his native place and attended the Ohio State University for one year. During vacations he worked at buggy trimming in one of the manufactories for which the town is famous. He always gave this experience much credit for the hand training that it furnished him.

In the fall of 1882 he entered the dental office of Dr. J. E. Whinnery, of Salem, Ohio, whose good influence upon Dr. Esterly was shown in the high character of his professional life. Dr. Whinnery was a man for whom he always had the greatest respect and affection.

In the autumn of 1883 Dr. Esterly entered the Ohio College of Dental Surgery and attended his first term. In the spring of 1884 he went to Lawrence, Kan., and took the office of Dr. J. D. Patterson, who removed to Kansas City, Mo. He remained in practice there until the fall of 1885, when he returned to the Ohio College and graduated in March, 1886. He received the gold medal for the best general examination of his class, exhibiting at that early period those superior qualities which so distinguished him during his only too brief years of practice. He returned to Lawrence, where he remained till his death, having built up, by his high professional abilities and personal integrity, an unusually extensive and lucrative practice.

Dr. Esterly was a man of remarkable ability and force as regards both

professional and business qualifications. He was remarkable also because in connection with this force of character there was combined a gentleness and sweetness of disposition that endeared him to all who knew him, and made him a power for good, both in his professional world and in his social and business relations. It was a saying of his that he "believed that he loved everybody that he knew, and that he did not have an enemy in the world." This was the keynote of his character. He was a living exemplification of the injunction that "He that would have friends must himself be friendly." He took a kindly interest in every one, and had a genial, loving nature that made friends by the hundred. As a local paper well said, "He lived among us for eighteen years, and endeared himself to our people. He always took an interest in public affairs, was conspicuous at public meetings, and always raised his voice for good government."

As a dental operator he was most rarely accomplished, brilliant, and successful. He set an example of high ideals and efficiency in his work that was an inspiration to all of his professional friends. He was enthusiastic in his love of his profession and in the pursuit of all that could contribute to the betterment of his practical efficiency. He was noted for his devotion to the clinics at the dental society meetings, and would stay by a demonstrator until he had learned every detail of what he had to show. He gave much time to dental meetings, and attended all he possibly could. He experimented considerably and brought out several very useful inventions, among others a pair of contouring pliers which are very excellent, also a blow-pipe for use with compressed air, which he had recently patented. He was an expert porcelain worker, and made some improvements in that department. He was the ideal dental practitioner, earnest, enthusiastic, brave in doing and defending the right in practice and ethics, continually studying and experimenting, making every effort to advance his own skill and the interests and dignity of his profession. There is no doubt that his untimely death was directly due to his excessive energy and devotion to his profession.

A large number of his fellow-practitioners from his own and adjoining states attended the funeral. At a called meeting of those present the following resolutions were adopted:

WHEREAS, It has pleased Almighty God in his inscrutable wisdom to remove from our midst our beloved friend and professional brother, Dr. Charles E. Esterly, in the strength of manhood and in the height of his usefulness to his profession and the community in which he lived, and

WHEREAS, A number of his professional brethren from Kansas and adjoining states have assembled to express our love and honor for our departed brother and to pay the last tribute to his memory; therefore, be it

Resolved, That while we bow in submission to the will of Him who doeth all things well, we express our profound sorrow and regret at his untimely decease, and the personal bereavement that each member of the profession feels.

Resolved, That we express our appreciation of the services that he has rendered to the dental profession, and that we honor his memory for the noble example of his life, for his high professional character and attainments, for the good influence he exercised upon both old and young who came into contact with him, and for the beauty of his personal friendship which endeared him to every one.

Resolved, That we extend our sincere love and sympathy to his devoted wife and brothers in this hour of their greatest bereavement, with the assurance that all of his and their friends sorrow with them in their great loss.

Resolved, That copies of these resolutions be sent to the bereaved family, and also to the journals and papers for publication.

Signed by A. H. THOMPSON, CHAS. L. HUNGERFORD, A. P. HULTS, committee; L. C. WASSON, chairman; J. W. O'BRYON, secretary.

Dr. Esterly was married October 25, 1887, to Miss Lena L. Hayden, of Columbiana, Ohio, who, with two brothers and his parents, survives him. His brother Dr. Geo. A. Esterly, of Topeka, will remove to Lawrence and take charge of the practice.

A. H. THOMPSON.

DR. L. T. SHEFFIELD.

DR. L. T. SHEFFIELD, the promoter and manager of the well-known International Tooth Crown Company, died of acute Bright's disease in New York city, September 20, 1901.

He was born at New London, Conn., May 28, 1854. After a period of dental pupilage with his father and a course of instruction at Harvard Dental School he was graduated from that institution in 1877. He was married May 28, 1883, to Mary Kyle, eldest daughter of Orr Kyle, Esq., of County Tyrone, Ireland. A widow and two sons survive him. Dr. Sheffield practiced in Paris in 1878-79 with Drs. Crane and Kingsley.

PERISCOPE.

TO KEEP SOLDER IN PLACE.—To keep your solder in place, add a little gum arabic to your flux and rub with the borax and water on the slate.—*Dental Office and Laboratory.*

SEPARATING THE MODEL FROM THE IMPRESSION.—Drop model and impression into hot water for a minute or two, after which they will separate without the least trouble, leaving the model much smoother than if whittled out. Another model, if desired, can be made from the same impression, as in nearly every instance two casts can be taken from the same impression.—*Dental Office and Laboratory.*

CROWNING OF TEETH HAVING LIVING PULPS.—In a paper read before the Kansas State Dental Association, and published in the *Western Dental Journal*, Dr. J. P. Root makes the following statement: There is only one time when it is permissible or excusable to crown without the destruction of the pulp. That is in old age, when there is a receded pulp and the tooth consequently is not sensitive or liable to death from other causes.

PHENACETIN AND QUININ IN ACUTE ALVEOLAR ABSCESS.—The internal administration of this combination is often followed by excellent results. The following prescription will be found to act favorably:

R—Phenacetin,
Quininæ sulph., āā. gr. xx;
In caps. no. x.

Sig.—Two every hour.

REMOVING BROACHES.—Should you break a barbed broach off in the canal, you will find that a good method of removal is to saturate the cavity with a 25 per cent. solution of pyrozone. In a difficult case, saturate a pledget of cotton with the pyrozone and introduce it into the cavity, sealing the same with gutta-percha or sandarac, and leave it in the tooth for upward of three or four days. When the patient returns, take out the application, and the broken broach will be readily removed, since the pyrozone has completely rusted and almost eaten it up.—*Journ. Brit. Dental Association.*

LYSOFORM AS A ROOT-CANAL FILLING.—Dr. Hentze in *Deutsche Zahnärztliche Wochenschrift* gives the result of his experiments with lysoform. He says that the disagreeable odor of this agent has been the cause of its being rejected in the Berliner Frauenklinik. It is a stronger antiseptic than lysol; on this account, and also because it does not irritate the tissues around the apical region, Dr. Hentze has used it as an ingredient in a paste for filling root-canals. His formula is as follows:

Zinci oxidi, gm. 30;
Zinci sulphatis, gm. 10;
Ol. menth. pip., gtt. ij;
Lysoformi, q.s. ft. pasta.

The oil of peppermint is used in this formula to disguise the odor of the lysoform. He has not used this paste long enough to tell positively whether the final result will be as good as the immediate effects, which, he states, are very satisfactory.

[The derivatives of formol have already been used for the purpose of filling root-canals. In the *DENTAL COSMOS* for July, 1901, there appears a paper by A. André, of Lyons, on "Formol and its Derivatives, with their Use in Dentistry," in which the author quotes Dr. Robin's formula for filling pulp-canals, which is as follows: Trioxymethylene, 1 gm.; zinc oxid, 9 gm. Trioxymethylene, as stated in the above-quoted communication, is obtained by heating an aqueous solution of formaldehyd.—ED.]

ANTIDOTE FOR TINCTURE OF ACONITE ROOT.—In a case of accidental poisoning, the patient having swallowed some tincture of aconite with which the gum over the roots of a large molar was being painted, twenty drops of laudanum, the dose being repeated after a few moments, with ammonia by inhalation, the patient being laid on the floor, brought him around all right in about thirty minutes. This antidote is not given in the text-books.—A. W. HARLAN, in *Dental Review*.

HOW TO REMOVE AMALGAM FILLINGS.—Hold a heated instrument on the filling until the heat is felt in the tooth, and then bur the amalgam out before it again becomes cold. It can then be easily removed. An instrument may be used for this purpose having a very slender shank with a bulbous end the size of a pea,—the writer uses one of the old Wood's metal fillers of forty years ago. This is admirably adapted for the purpose, as the slender shank prevents the heat from radiating too rapidly.—*International Dental Journal*.

REPAIRING HOLE IN GOLD CROWN.—Dr. E. A. Randall, in the *Dominion Dental Journal*, gives the following method of repairing a gold crown in which a hole has been made during the finishing process: Paint the crown all over the outside with whiting mixed thin, except around the hole which you wish to repair; fill this with a plug made from gold foil, touch it with a drop of borax water, and put a bit of gold solder inside; heat it with blow-pipe, and success will be attained.

LABORATORY BENCH DRESSING.—In order to enable a laboratory bench to withstand the action of acids and alkalies and retain a neat appearance, stain the table top with the following preparation: Solution A—Copper sulfate 125 gm., potassium chlorate 125 gm., water 1000 c.c. Dissolve by boiling. Solution B—Anilin hydrochlorid 150 gm. in water 1000 c.c. Apply solution A with a brush, twice successively, allowing the bench to dry between the applications. When dry, apply solution B similarly, and again allow to dry. The next day rub well with raw oil applied by means of a cloth.—*Ohio Dental Journal*.

DISSOLUTION OF CAOUTCHOUC.—When it is desired to dissolve caoutchouc a very satisfactory solution is obtained if the caoutchouc is first freed from water: it is advisable to dry the caoutchouc for some time before the dissolving, and a very excellent plan is to subject it to a previous boiling in soda solution or caustic soda lye, with a careful washing and drying.—*India-Rubber World*.

REMOVAL OF VULCANITE FROM FILES.—When files are clogged with vulcanite, place them in a solution of one part saltpeter, three parts sulfuric acid, and one part water. Then brush them with a stiff brush, adding sufficient soap. This process not only removes all the vulcanite, but sharpens the files as well. —*Zahntechnische Reform.*

METHOD OF REPAIRING PARTIALLY BURNED-OFF BACKINGS.—To repair backings under heat when partially burned off, take non-cohesive foil, say a fourth of a leaf, roll into a rope, and while the investment is yet hot pack this rope where the break has been made. The foil will stick readily, and by placing on a little soldering flux and solder the backing may be nicely patched, thus preventing the necessity of stopping the work or discarding the teeth.

COMPLICATED PERICEMENTITIS IN A TOOTH HAVING A LIVING PULP.—Dr. Samuel Sandor reported the case of a girl sixteen years old who consulted him with regard to an upper left central incisor which was causing her acute pain. An examination showed the presence of inflammation in the gum overlying the tooth. Pressure against the apical region caused pain, and the tooth was slightly elongated and discolored. On the distal surface a small cement filling was present. He diagnosed the case as being either one of pulpitis chronica gangrænosa *descendens* with diffuse periodontitis or else pulpitis chronica gangrænosa *ascendens* with diffuse periodontitis due to some traumatic cause. The patient, however, negatived the latter idea. Dr. Sandor wanted to trephine the tooth, but the pain was so great that he had to abandon this plan of treatment. He then prescribed ice compresses and applications of tincture of iodine. But as the pain did not diminish he ordered hot compresses, and two days after the abscess opened, two millimeters above the gum border. The pain then disappeared, and on examination it was found that the pulp was alive. Then he saw that he had made an erroneous diagnosis and concluded that it was a case of periodontitis circumscripta. —*Oesterr.-ungar. Vierteljahrsschrift für Zahnheilkunde.*

MANIPULATION OF GUTTA-PERCHA USED FOR SEPARATING.—If when using gutta-percha for separating purposes the material is softened, it is often difficult to fix it tightly between the teeth. Cut a piece from a sheet and press it into place cold, then smooth and trim into shape with warm burnishers. —R. OTTOLENGUI, in *Independent Practitioner.*

HOW TO KEEP SMALL INSTRUMENTS FROM RUSTING.—Dr. R. H. M. Dawbarn keeps his small instruments and needles in alcohol to prevent their becoming rusted. He states that instruments kept in this fluid for a month were, when taken out, as bright as ever. —*Medical Record.*

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler. A star (*) indicates a thesis.

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PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING SEPTEMBER, 1901.

- Sept. 3.—No. 681,770, to WILLARD J. WORSLEY. Teeth separator.
 " "—No. 682,077, to CHARLES E. HOFFMAN. Porcelain crown facer.
 " "—No. 682,098, to WM. T. LYON. Dental appliance.
 " 10.—No. 682,308, to LUTHER A. YOUNG. Rubber-dam holder.
 " "—No. 682,317, to MONROE N. CALLENDER. Dental engine.
 " "—No. 35,080, to MILLARD WINFIELD GRIGG. Design for dental engine hand-piece attachment.
 " 17.—No. 682,597, to GEO. L. BENNETT. Dental forceps.
 " "—No. 682,668, to WILLIAM M. BRUCE. Dental articulator.
 " "—No. 682,756, to JOHN C. SCHROEDER. Artificial denture.
 " "—No. 682,836, to LUCIEN H. ARNOLD. Tooth-brush.
 " "—No. 682,892, to EMMA J. THURSTON. Toothpick.
 " "—No. 11,931, reissue to FRANK RITTER. Dental chair.
 " 24.—No. 683,075, to ADAM SCHNEIDER. Appliance for cleaning the teeth.
 " "—No. 683,198, to JOHN G. BURCHELL. Means for fastening artificial teeth.



J. A. Long.

THE
DENTAL COSMOS.

VOL. XLIII. PHILADELPHIA, DECEMBER, 1901.

No. 12.

ORIGINAL COMMUNICATIONS.

BURS AND BUR SHAVINGS.

BY I. NORMAN BROOMELL, PHILADELPHIA, PA.

(Read before the Pennsylvania State Dental Society at Ligonier, July 9, 1901.)

THE object of this paper is twofold. It is hoped that it may serve a practical purpose, first, by noting the character of bur shavings as produced by burs of various sizes, shapes, grades, and different degrees of sharpness; and, second, by showing that the shavings thus produced present a convenient method for the microscopical examination of the tissues of the teeth, normal and otherwise.

First let us accept the doctrine that the painful effect produced by the cutting of all animal tissue can only be reduced to the minimum by insuring a keen, sharp cutting-blade in the instrument employed. Again, the shape of the blade and the direction in which it must pass in making the incision are factors which have much to do with the sensations produced. Recognizing the foregoing principles as of the utmost importance in general surgery, let the same be applied to minor operations, and especially to the removal of certain portions of the delicate and sensitive tooth-structure for the eradication of such diseased conditions as affect them. It would seem that too often the dentist loses sight of the fact that in a majority of instances his work upon dentin and enamel is called for when these structures are to a great degree involved in a state of inflammation and hypersensitiveness, while many, if not a majority, of the operations in general surgery are upon normal tissue.

The careful worker in wood, to achieve the best results from his skillfully prepared chisel and plane, must study the grain of the

wood in order that the tool may be applied in such a way that the chips and shavings resulting will peel off in graceful curves without injury or disarrangement to the surface from which they have been removed. Included, therefore, in this essay will be some suggestions as to the shape of the burs employed, the direction in which the force should be applied, together with the stroke of the instrument during its revolvency, the idea being as nearly as possible to profit by the practical suggestion so strongly in evidence in the case of the wood-worker, and to produce, with the desire of reducing pain, clean and well-cut shavings in the preparation of cavities for the reception of a filling. It must be borne in mind that the paper does not refer to the removal of large masses of

FIG. I.



decay, but to the finer or final work when shaping the cavity and working for the most part upon normal tissue, which part of the operation is usually accompanied with the greatest amount of pain.

I will first show the effect of burs of various shapes when held at an angle of forty-five degrees, the pressure being toward the center of the tooth and without lateral or rotary movement of the hand-piece. The burs used in this first series of experiments were all new and of standard quality. Next in importance to the shape of the burs employed is the question of velocity, but this will be considered under a separate heading.

Fig. I shows the effect of a large round bur upon normal dentin while running it at high speed. As will be observed, the shavings are well formed, slightly concavo-convex, with their free margin somewhat ragged. The thickness of the tooth-shavings is, of course, entirely regulated by the pressure exerted, in this specimen

being somewhat thick, and thus denoting the application of considerable pressure. If, however, too much pressure is applied, the tissue is torn away in irregularly formed chunks, as though a rasp, rather than a sharp-cutting device, had been employed, this being to the detriment of the surface left behind.

Fig. 2 shows the character of the shavings produced by a large oval bur, the amount of pressure being about the same as that employed in Fig. 1. Burs of this form furnish a long cutting-edge, and the shavings have a barrel-shaped appearance. For general use, the oval bur has a decided preference over the other forms, because it matters but little in what direction the working force is applied, with sharp blades this bur will produce clean-cut shavings, and it may well be considered a universal instrument.

FIG. 2.

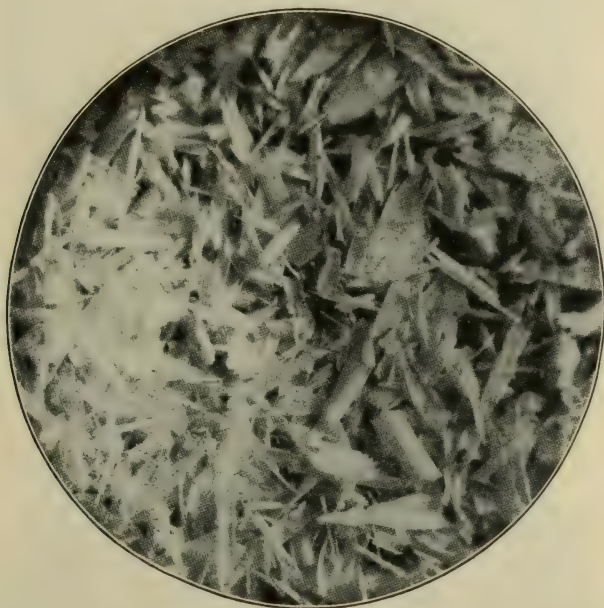


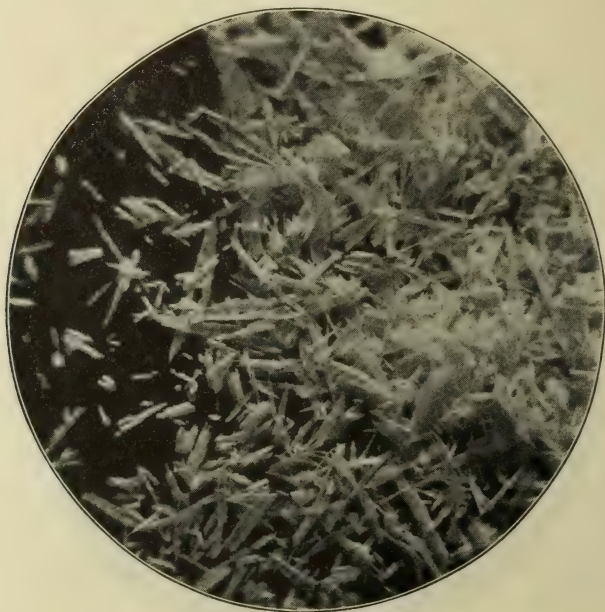
Fig. 3 gives under low power of the microscope the splinter-like shavings from a small fissure bur while being held at an angle of forty-five degrees with the tooth-surface. The shavings are for the most part clean-cut, but they vary in length, corresponding with the long and short cutting surface at work when this bur is applied in the manner mentioned. With use of the fissure bur, the shavings produced are a combined product of the wheel and fissure instrument, the cutting qualities of the free end of this bur being about the same as a wheel bur of the same size.

A very important consideration in the construction of burs, and one which greatly influences their cutting qualities, is the depth to which the steel has been cut to form the blades. Upon first thought, it might appear that this was a consideration of little importance so long as a reasonable depth was given to the blades, but by com-

parison of their products it has been found that they may either be too deep or too shallow. In the first instance, the tendency for the bur to clog is most pronounced, while in the latter, in the bur with shallow blades, the limited space for clearance back of the cutting-edge is responsible for a sufficient repulsion to cause the shavings to be jammed and broken, and in this way materially interfere with the functional worth of the tool.

Fig. 4 shows how imperfectly the shallow blade does its work, the *débris* being the product of a sharp but shallow-cut oval bur. The beginning of well-formed shavings is apparent, but no sooner has this taken place than the back force from the shallow blades

FIG. 3.



tears them asunder. The wheel bur, be it ever so sharp, is, from the standpoint on which this paper is written, most poorly calculated to do the work expected of it.

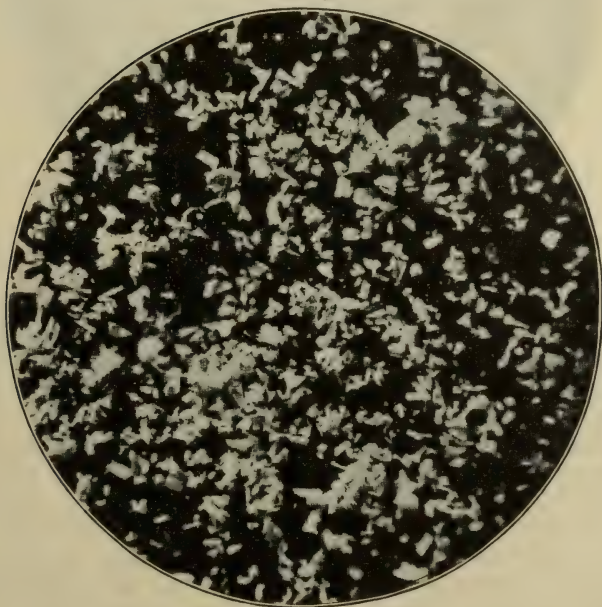
In Fig. 5 the shavings from a medium size wheel bur are shown. This bur, being held at an angle of forty-five degrees, presents two cutting surfaces,—one upon the side, and one upon the end of the instrument,—the combined results being that the surface of the dentin, which should be left as smooth and polished as possible, is very much mutilated, as manifested by the irregular particles removed from it. The general outline of the ordinary wheel bur is so nearly duplicated in the oval bur that it would seem the latter might with considerable propriety entirely supersede the former. Nothing is gained in the preparation of a cavity by inflicting upon it a surface full of angles, such as are bound to result from the use of the wheel bur; and as all parts accessible to the wheel bur may

be reached with equal facility by the oval bur, there is no good reason why the latter should not be given the preference.

FIG. 4.



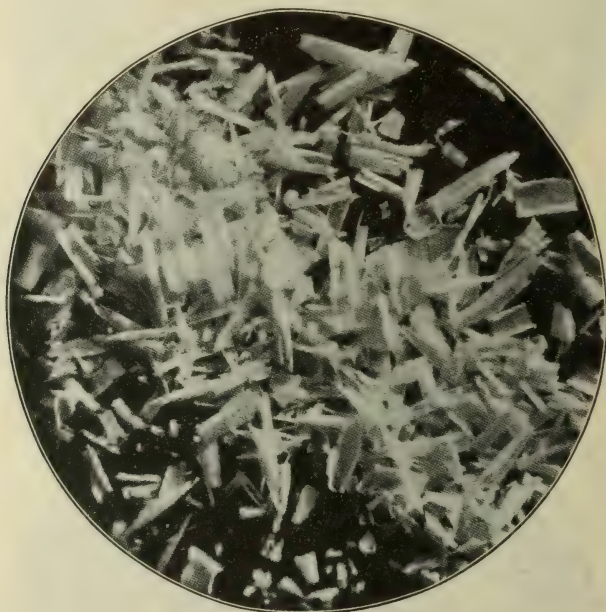
FIG. 5.



The cone-shaped bur, as well as the inverted cone, requires special care in manipulation in order to bring about the best results.

The former has the most limited field of any of the standard forms, and its cutting qualities are only brought out when it is held at right angles to the surface of the tooth and direct pressure is applied. If the cone-shaped bur be held at an angle of forty-five degrees, which position is, however, seldom called for or readily gained, its value as a cutting appliance is very much reduced. Outside of the services which the inverted cone renders in assisting to open up cavities and fissures, its field of usefulness is quite limited, if this may be to any extent judged by the nature of the shavings produced. In using the inverted cone upon normal dentin, the best results are obtained by drawing the bur backward slightly while making the cut. Doing this and holding the hand-piece at an angle of forty-five degrees with rapid motion and slight pres-

FIG. 6.



sure, this bur, although angular in outline, appears to give results second to those produced by the oval bur. The shavings are semi-cylindrical in outline (see Fig. 6), with extremities having the appearance of being cut away rather than ground or torn, as is frequently the case with dull and poorly formed burs. The oval bur, to which decided preference is given for general service, produces a much better result when drawn backward during its revolucency than when pushed forward. This may, however, be said to be a constant observation in the use of nearly all bur forms.

We have seen the effect of burs in good condition upon normal dentin; let us next examine the refuse from dull and indifferent burs upon the same structure. The effect produced upon the tissue by instruments of this character is, as might be expected, a tearing and grinding rather than a cutting effect. The position in

which the dull bur is held, the amount of pressure applied, and the movement of the bur about the cavity have little to do with the character of the shavings produced, and prove beyond doubt that they are inadequate.

Fig. 7 shows the shavings from a large fissure bur the cutting qualities of which have suffered materially from prolonged use. Maximum pressure was applied with this bur, and while the semi-cylindrical character of the shavings is partially apparent, their sides and extremities are so ragged and torn that they give evidence of being dislodged by force rather than peeled or cut away.

FIG. 7.



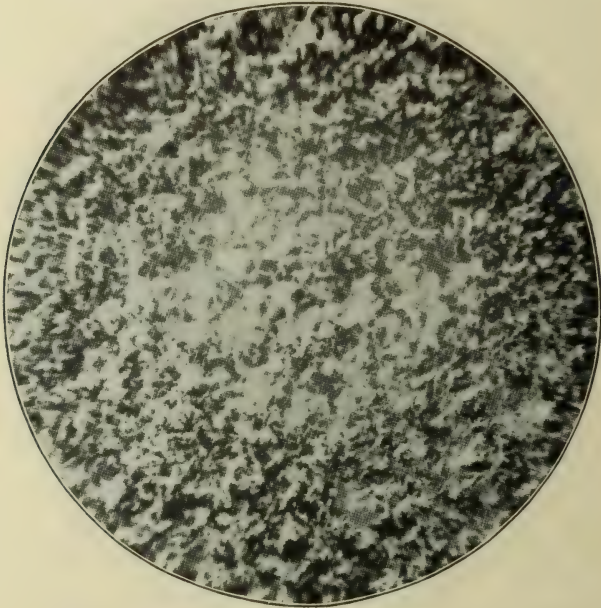
Defects on the cutting surface of two of the blades of a fissure bur, as noted by the magnifying glass, prompted trial of a cross-cut bur, the chief claim for burs made in this way being that they are in a measure self-cleansing. However this may be, their use as a cutting appliance is not desirable, the result being a mass of finely powdered dentin.

These few illustrations will serve sufficiently well in regard to the result of dull burs, and, as no question exists between the choice of dull and sharp burs, no further attention will be given to this part of the subject.

The effect which the different burs give upon normal enamel does not vary to any considerable degree, although one class of burs will dislodge this tissue with greater rapidity and less sensation than another. The nearest approach to producing enamel shavings is found in the use of the cross-cut or dentate fissure bur, the bur so poorly calculated for cutting dentin. By the use of the dentate

fissure bur, rapid speed, and a slow but steady backward and forward movement, normal enamel comes away in very minute particles, as shown in Fig. 8. These minute particles, when examined with a moderately high power, have a slight resemblance to the shavings from dentin, but with a still greater magnification are found to be made up of variously shaped pieces of tissue closely resembling the individual enamel prisms. These are not cut, but actually ground or rasped from the surface. All other burs appear to affect the enamel by gradually wearing it away. The movement of the bur backward and forward, maximum or minimum pressure, or the application of the instrument in different directions, makes

FIG. 8.



little or no difference in the result. Many other forms were used to complete the experiment, but the result so nearly resembled this that further investigation was unnecessary.

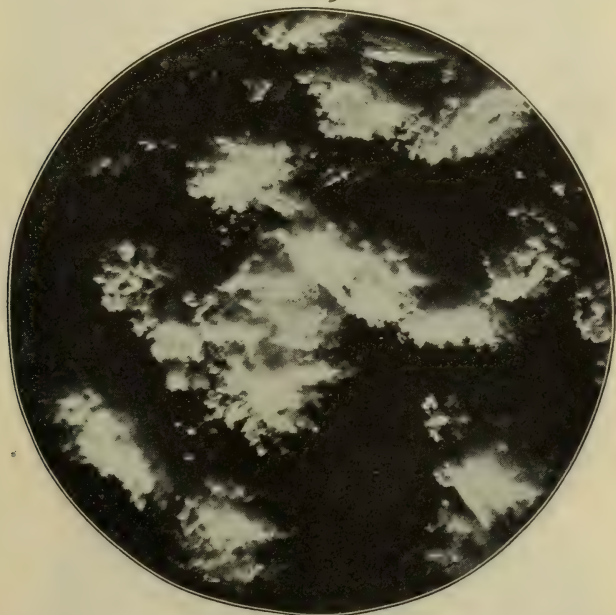
When the enamel is affected by caries of whatever variety, it is impossible to do more than force the refuse out, this coming away in a flake-like mass (Fig. 9), the supporting power of which appears to be the result of an organic accumulation within the meshes of the broken-down structure.

The central mass of decayed dentin in those cases in which considerable progress has been made has become so disorganized that it matters but little how this broken-down tissue is removed; that is, the clean-cutting instruments are not nearly so essential as when working upon normal tissue or that in which the process of disintegration is just beginning; but, as it is not always possible to judge of the depth of the decay, sharp burs should be employed

soon after the removal of the softened mass from the central part of the cavity, in this way insuring a minimum amount of pain as soon as the normal dentin is reached.

Fig. 10 shows a mass of yellow-brown decay removed from a tooth in the mouth by use of a sharp oval bur. The greater part of this *débris* is observed to be completely disorganized. Other parts have been slightly attached, but the matrix is yet sufficiently strong to hold the integral parts together, while in a few places normal dentin is apparent. This slide, therefore, shows the effect of the bur on three conditions of the same tissue, and serves to introduce the subject of the cutting qualities present in the many

FIG. 9.

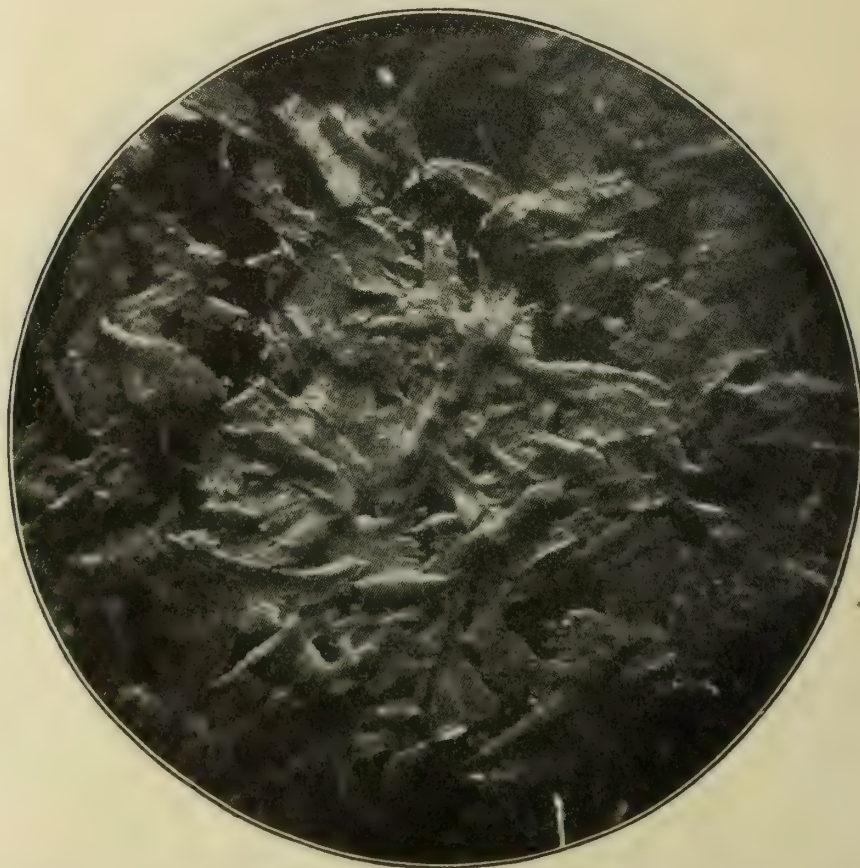


varieties of decay in the teeth. Just as we find a variation in the effect of different burs on normal dentin, so we find different varieties of decay variously acted upon. In dentin in the first stages of decay, and of the brown-yellow variety, a certain amount of toughness or tenacity is exhibited, so that with a sharp bur this variety of decay is capable of being removed in fairly well-formed shavings. This is not true of black decay in any part of its bulk. The destructive process in caries of this variety is so extensive, causing such complete disorganization, that with the sharpest burs, no matter in what direction applied, the *débris* appears in the form of a lumpy powder. The difference in the cutting quality of carious surfaces can, of course, be readily accounted for when we consider that the discoloration is determined solely by the absorption of various coloring materials into the tissue as decomposition progresses, the process of decay in itself having little if anything to do with this feature of the phenomenon. Some discolorations are

therefore produced by agents which in a measure assist in supporting the broken-down dentin, while others apparently lend to the force at work in the dissociation of the parts.

Fig. 11 shows *débris* taken from the base of a cavity of white decay. In this specimen the decay may be considered as being unaffected by any change in quality such as might result from a penetration of coloring material. The action upon the tissue has been such that a complete destruction of the matrix has resulted, and, although the floor of the cavity had the appearance of entire freedom from carious areas, careful use of a sharp oval bur reveals the fact that the tissue was defective far beyond the point indicated by the sense of sight or of touch. In the manipulation of the bur

FIG. 10.



used to produce this specimen, a medium-sized oval bur, the least possible pressure was exerted, and this accounts for the well-formed shavings obtained from the softened disorganized dentin. The instant that additional pressure was brought to bear, there was an increase of pain, and a marked change in the character of the *débris*.

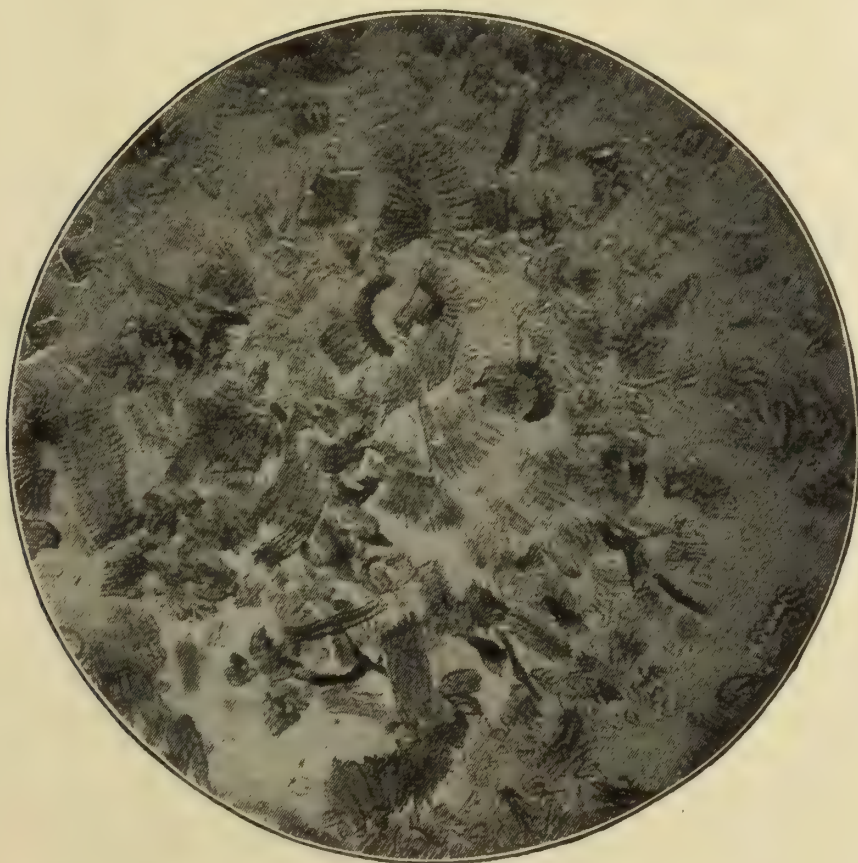
In conclusion, I wish to refer to the advantages attained in the study of normal and abnormal dentin by the use of bur shavings from this tissue. These are offered solely as a means of improving the present technique, that of grinding or decalcifying and cutting the sections, both processes frequently resulting in a structural transformation sufficient to mislead the investigator. The advantages referred to are these: the tissue may be studied while the tooth is vital; the sections may be made so thin that the high power objective will readily penetrate them. They can be taken from dif-

ferent parts of the cavity of decay and when working upon the base of the cavity; the possibilities of including in a single shaving

FIG. 11.



FIG. 12.



a district partly made up of carious and partly of normal tissue are such that the progress of this disease may be investigated with a

great deal of satisfaction. To emphasize the value and importance of this feature of the paper, but without pretending to study

FIG. 13.

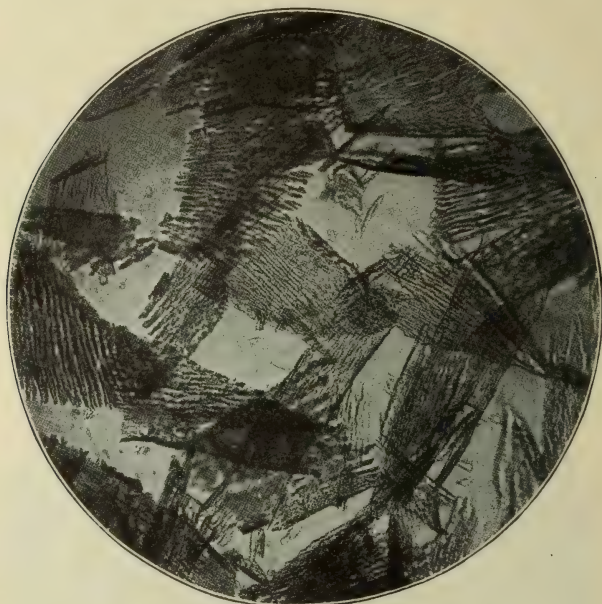
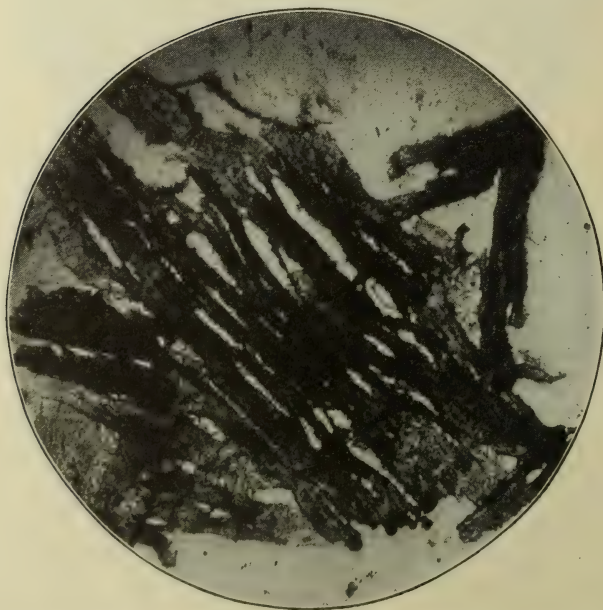


FIG. 14.



minutely the sections, a few slides will be shown in support of the possibilities of the methods suggested.

Fig. 12 shows a mass of shavings from normal dentin mounted in balsam, and examined by reflected light with low power. It argues for the simplicity and dexterity of the method. The shavings were caught upon the mouth-mirror, transferred to a slide, mounted in balsam, and ready for examination within two or three minutes. Notwithstanding the fact that a one-and-a-half-inch objective was used, many of the histological characteristics of the tissue are visible.

Fig. 13 shows some of the shavings from the same specimen under higher power. The tubuli and intertubular substance are well brought out, and are capable of being examined with an oil-immersion lens. The most important field for the method under consideration lies in the investigations which have to do with carious conditions of the dentin.

To be sure, these specimens suggest but little except in the way of comparison, but the possibilities of the method are approximately well exhibited in Fig. 14, which shows a single shaving part of which is decayed dentin and part normal tissue. It shows the characteristic swelling of the tubuli and breaking down of the intertubular substance and general disorganization of the entire tissue.

This method of examination is not offered with the idea of completeness, but more as a suggestion, with the hope that it may prove of value when more carefully worked out. For the present, the essayist must be content to allow the idea to rest here.

THE TEETH OF PITHECANTHROPUS ERECTUS.

BY DR. OSCAR AMOËDO, PROFESSOR AT L'ÉCOLE ODONTOTECHNIQUE, PARIS.

(Read before the French Association for the Advancement of Science, at its meeting at Ajaccio, 1901.)

IN 1898 I gave, in my treatise on "Dental Art and Legal Medicine," an anatomical description of the teeth of *Pithecanthropus erectus*,—a description that differed notably from those made by the savants up to that time. I would not have returned to the subject, so palpitating with interest, if the discussion had not brought forth more recent papers of exceptional interest. The principal one is that of G. Schwalbe, published in the *Zeitschrift für Morphologie und Anthropologie*, vols. i and ii. The interest taken in the subject by Emperor William II, and also by an American millionaire, Mr. Vanderbilt, is well known. As, in the discussion raised by this subject, the examination of the dental organs is of first importance, we have considered it our duty to again take up the matter and complete our first description. We consider it to be the duty of the dentist to take part in the discussion, and as the excavations have put us in possession of several dental specimens, to give the results of our investigations. Our profession has been so often accused of empiricism that we ought not to lose an occasion to show what the resources of our art can contribute to general knowledge in the

relations of odontology with general science. I will state briefly the history of the question.

In 1891, Dr. Eug. Dubois, a Dutch military surgeon, found in Java, in the formation belonging to the upper Pliocene or to the most ancient Post-tertiary period, portions of a skeleton consisting of the top of the cranium, two molar teeth, and a femur. In his description of these pieces ("Pithecanthropus erectus,—eine menschenähnliche uebergangsform aus Java," Batavia Landesdruckeri, 1894), he attributes them to an animal intermediate between man and the large anthropoid apes,—that is, in other words, the true ancestor of man, or the *Pithecanthropus erectus*.

M. Manouvrier, who spoke before the Anthropological Society on this subject, said that it so happened that the three pieces found were exactly those from which we could draw the best conclusions as to the form and size of the encephalus, the attitude of the body, and the importance of the maxillaries in their relation to the cranium. "These three pieces," he said, "are exactly the ones I would have chosen to study the question, if I had been given the choice of but three pieces out of the complete skeleton."

Laying aside everything that does not concern the dentist directly, we will occupy ourselves with the molar tooth found near the cranium. It is an upper third molar, according to M. Manouvrier, of which the grinding surface alone has the aspect of a human tooth. Its volume, the direction antero-posterior of the crown, and the extensive separation of the roots do not permit us to attribute it to man. On the other hand, it differs from the teeth of the gorilla and the chimpanzee. M. Manouvrier has searched the Broca Museum for a tooth of the same development. After having examined the crania of a hundred negroes of Africa and New Caledonia he found such a tooth in the skull of a New Caledonian, a Kanalian. It is a lower third molar, but we know that the lower third molars are generally larger than the uppers, the former sometimes attaining a giant size, the latter sometimes being of a stunted growth. As for the upper third molar, he could find none resembling the Java tooth. He considered it as belonging to an anthropoid or to an extinct human race. It was on comparing the large size of the tooth with the small dimensions of the cranium that Dr. Dubois found himself, he believed, in position to say that he was in the presence of an ancestor of man, the most ancient known up to that time.

I will not enter into a debate with the savants regarding the skull. Some of them,—as Cunningham and Turner, in England,—consider it as being a human skull; others,—as Kräus, Virchow, Luschen, and Waldeyer,—believe it belongs to an anthropoid. M. Manouvrier, while proceeding with extreme caution, attributes the very greatest importance to Dr. Dubois' discovery and is inclined to his opinion. He had an opportunity of seeing the pieces when Dr. Dubois was in Paris, and has contributed

another communication, published by the *Bulletin* of the Anthropological Society. He was struck by the complete state of fossilization of the bones, a state comparable to that of the pieces of Trinil and Neanderthal. The skeletons of the most ancient of the Post-tertiary period,—those of Spy, for instance,—have preserved an aspect but little different from the neolithic ossifications.

The examination of another tooth found near the first, and of the existence of which M. Manouvrier did not know until later (an upper second molar according to him), and a comparison of it with the first tooth, has enabled him to dispose of the theory attributing it to an anthropoid. He concluded that he was in the presence of a race of the forerunners of man and one anterior to the race of Neanderthal and Spy.

I have no intention of passing in review the numberless articles that have appeared in the newspaper and scientific press on the subject. I will cite only the last article of M. Manouvrier, "Réponse aux objections contre le Pithecanthropus" (*Bull. de la Soc. d'Anthropologie*, Paris, 1896), the interesting articles of M. J. Mies, "The Intermediary Forms between Man and Animal" (*Corr. d. acrytlich. Vereine in Rheinland u. Westfalen*, 1897), and the recent paper, already cited, of Schwalbe, "Études sur le Pithecanthropus erectus de Dubois."

At the exposition of 1900 there was exhibited, in the section of the Dutch East Indies, a reconstruction of the Pithecanthropus made by Dr. Dubois. This led to a protest from MM. Manouvrier and Himly, at the International Congress of Anthropology, at the haste of Dr. Dubois to cut off the debate. In their opinion the question was still unsettled, and it was premature to attempt such a reconstruction, on account of the danger of creating a bias in one or the other direction without sufficient documentary evidence.

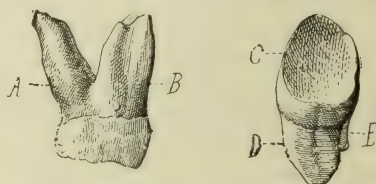
I will call attention to a recent work presented to the Academy of Vacluse by M. Gabriel Bourges. This author, having knowledge of the existence of but one tooth attributed to the Pithecanthropus, has perpetuated, in his description, the old errors committed by the anatomists who had examined it; and I believe I have been the first to call attention to the fact that the long diameter of the crown is transversal (bucco-lingual) and not antero-posterior (mesio-distal), as has been said. As most of the ethnological considerations are drawn from this abnormal direction of the tooth, it seems to me well to take advantage of a reunion where are assembled so many representatives of the different branches of science, to give my opinion upon the anatomical characters of these teeth.

We have two upper teeth,—a left first molar and a right third molar. The roots are of a dark red, almost black; the crowns white. The crowns are swollen, blistered, narrowing rapidly toward the neck, with the exception of the mesial face, which, by compression against the neighboring tooth, is markedly flattened. The grinding surface of the first molar is so worn away that it no longer presents the fissures and tuberosities that

existed there normally. The wear has left a surface a little concave, following the bucco-lingual diameter. The third molar, on the contrary, has not been worn away, except that a small tubercle on the mesial border shows some slight traces of wear. The roots are short and the palatal root of the first molar diverges a little. All the roots of the third molar, the palatal and the two buccal, which two are united, are strongly divergent.

First molar. This tooth has been considered by the anatomists who have described it as being the second molar. If we compare its anatomical characteristics with those of the first molar we find an absolute resemblance. In fact, its crown, looking at its grinding surface, has the form of an ovoid, and its greater mesio-

FIG. 1.

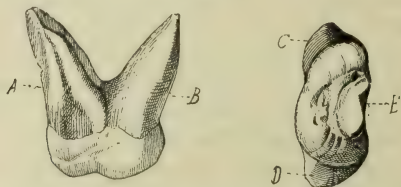


Upper left first molar. *A, D.* Palatal root. *B.* Buccal roots. *C.* Mesial surface. *E.* Distal root.

distal axis is situated on the palatal or lingual side. With the second molar, on the contrary, the grinding surface has a diameter mesio-distal larger on the buccal side.

Besides, the disto-lingual fissure, which has disappeared from the grinding surface, crosses the marginal lingual border and appears on the entire lingual surface of the crown and root,

FIG. 2.



Upper right third molar. *A.* Buccal root. *B.* Palatal root. *C.* Buccal side. *D.* Lingual side. *E.* Mesial surface.

dividing the tooth into two lobes, mesial and distal. This is a characteristic never found on a second molar, its lingual surface being always round. As for the roots, the palatal is flattened in the linguo-buccal direction, as in all first molars, while in the second molars it is round. Of the buccal roots the mesial is longer and larger than the distal, and is grooved throughout its entire length, giving the appearance of two roots united, which is probably

the case, as there seem to be two apical foramina. The distal root is slightly rounded, and is united to the mesial.

There is no doubt in my mind as to this tooth being an upper left first molar.

Third molar. Contrary to the descriptions that have been given of this tooth, we find that the longer diameter is linguo-buccal (transversal) and not mesio-distal (antero-posterior). In general its crown is larger than the ordinary type of upper third molars. Its form is about normal; it is flattened on the mesial (anterior) face by the pressure exerted by the second molar, this

MEASUREMENTS OF THE TWO TEETH.

In Millimeters.

	Long diameter, crown to apex.		Neck to buccal cusps.	Neck to lingual cusps.	Neck to apex of buccal root.	Neck to apex of palatal root.	Mesio-distal diameter of crown.	Bucco-lingual diameter of crown.	Mesio-distal diameter of neck.	Bucco-lingual diameter of neck.
	Buccal roots.	Palatal roots.								
FIRST MOLAR.....	19	17	6.5	6	12.5	11	12	13.3	8	12.5
THIRD MOLAR.....	22	19.5	8.5	6.5	13.5	12	11	15.5	8.5	9
<i>Normal measurements (after Black).</i>										
First Molar {	average	20.8	7.7		13.2		10.7	11.8	7.5	
	greater	24	9		16		12	12	8	
	smaller	17	7		10		9	11	7	
Third Molar {	average	17.1	6.3		11.4		8.6	10.6	6.1	
	greater	22	8		15		10	14.5	8	
	smaller	14	5		8		7	8	5	

face terminating at the buccal and lingual extremities in sharp angles, being rounded at the three other faces, so that they conform with each other. This is a characteristic of all third molars, however, owing to their position at the extremity of the dental arch, having no tooth to compress the posterior surface. Its palatal root is short, relatively diverging, and is flattened in the bucco-lingual sense. On comparing it with the first molar it is seen to be rounder. Its two buccal roots, also diverging, are united, the mesial (anterior) presenting a striking analogy with the same root of the other tooth,—that is, it is grooved as is that tooth in its entire length. The distal root is a little longer. I give in the table the measurements I made of the two teeth.

It is not my province to draw conclusions from the descrip-

tions I have given. I have merely undertaken to give as complete a description as possible; it is for the anthropologists to draw their conclusions from my work. I shall be happy should my contribution prove to be of any service in the building up of so beautiful and difficult a science as theirs.

DIATHESIS.

BY C. M. WRIGHT, A.M., D.D.S., CINCINNATI, OHIO.

DIATHESIS plays an important *rôle* in all the relations of life, even in the practice of a surgical and mechanical profession like dentistry.

The operations upon enamel and dentin and the restorations with gold and amalgam are not altogether mechanical, as they would be if made upon models in the laboratory. The devitalization of a pulp, medicinally or surgically; the removal of the *débris* and the perfect filling of the canals by a rule of thumb; the treatment of gingivitis by one method or formula, and the employment of an *ex-cathedrâ* system for the management of pulps is not scientific when we take into account diathesis and its influence on all tissues in health and in disease.

We seek a *system*,—a system of operating and a system of treatment; a definite etiological factor like a special bacillus. We strive for a law that will permit satisfactory routine practice, but the ideal in therapeutics can only be found when we have the ideal disease, which must be a purely local one in the midst of the absolute health of the rest of the organism.

This absolute health implies a uniform vital power in secretions and protoplasm that would prevent disease, effect recovery from injury, and protect from destructive invasions,—an immunizing, neutralizing condition of living tissue.

We, in common with other medical men, are not called upon to treat such cases. Only the sick need a physician, and the sick are those who inherit a *diathesis*. A diathesis is not a disease. What do we mean by struma? It is not a disease, but a diathesis,—a condition. The strumous are not always sick; they are simply susceptible to glandular and circulatory disturbances and probable tubercular infections. There seems to be a lack of physiological persistence in well-doing in gland tissues,—a weak resistance to immediate or even remote irritations which cripples the tissues found in lymphatic nodes and spaces, and prepares them for invasion by infections. The irritations are not necessarily septic in character.

We believe that thermal or mechanical irritations of the pulp of a tooth can cause enlargement of a comparatively remote cervical gland in these strumous people. Two such cases have fallen under my observation. The natural hyperemia resulting from the irritation produces excess of exudate from the bloodvessels, and the

lymphatics have not the physiological force necessary to remove or care for the overflow in a normal way; the leucocytes are not vigorous, and perform their work in an imperfect, weak way; the gland becomes crowded with these incompetent laborers and their imperfect work, and we have an inflammatory swelling and degeneration. All this with no sepsis as yet, and simply because of diathesis.

Will the same system of filling, or capping, or devitalizing apply here as in another of less or different diathetic susceptibility?

We deal with the bilious, the nervous, the gouty diathesis, and the combinations which can be formed.

I do not feel competent to pass judgment upon nor to accept as indisputable the statement of Heitzman, that a life insurance company could form a better estimate of the present health and probable longevity of an applicant by a microscopic examination of his white blood corpuscles than by the customary methods of physical examination. Still, after hundreds of observations made during the past twenty years with this novel proposition in mind, I must recognize the conviction that there seems to be a relation between the plump, or lean, or granulated appearance of the leucocytes and the health of the person whose blood is examined, and I am disposed to hold to it as an hypothesis.

It helps me in mental pictures of diatheses. It seems to solve certain pathological problems.

If we recognize, even in a general and indefinite way, the influence of temperament, we must conclude that a fixed system of practice, even in mechanical therapeutics, must be subject to modifying conditions of living tissues; and such questions as have recently occupied some attention, as to the advisability or desirability of the devitalization of pulps in adult life or about the treatment, by this or that method, of ulitis or pulpitis, or even alveolar abscess, cannot be answered excepting with *provisos*. There is no positive yes or no in the case, because diathesis stands behind every patient, influencing the effects of diet, clothing, air, exercise, bathing, and even thought, making it plain that "one man's meat is another man's poison."

As we advance in knowledge of biology and physiology, we appreciate more fully the truth of the homely proverb, and also that scientific medical practice is based on discrimination as to when meat is food and not poison to each individual who comes to us for treatment.

The medical philosopher recognizes diathesis in considering the questions of the day, such as the value of alcohol as a food; "Kochism"; laboratory *versus* clinical observation, their value, etc.,—and is not liable to be carried to the extreme of dogmatism.

"Ah, sir, a distinct universe walks about under your hat and under mine! All things in nature are different to each,—the woman we look at has not the same features, the dish we eat from not the same taste to the one and the other. You and I are but a pair of infinite isolations, with some fellow islands a little more or less near to us."—*Thackeray*.

PROCEEDINGS OF SOCIETIES.

INTERNATIONAL DENTAL FEDERATION: FIRST GENERAL MEETING,
HELD AT CAMBRIDGE, ENG., AUGUST, 1901.

(Continued from page 1286.)

THE president said that after the remarkable speech of Sir Michael Foster he could not hope to say much, because his knowledge of English was very limited. He was almost impelled to close his manuscript and sit down, as there appeared to be nothing more to say. He had come to the town of Cambridge and to its university not only to place himself under the instruction of great philosophers, but to feel the influence of the education which had been going on there for centuries. Sir Michael Foster had spoken and advised on a question which divides the dentists throughout the whole world, and Sir Michael had said what was to be said better than any one else had ever said it before. But, as he had prepared a speech, he supposed that he must say something, and he claimed their indulgence.

The president then delivered the following

INAUGURAL ADDRESS.

Mr. Chairman and Gentlemen,—Last year, the twelve hundred dentists who attended the Third International Dental Congress, which was held at the time of the Paris Exposition, decided to preserve the professional organization created in view of that Congress by organizing the International Dental Federation, with its Executive Council and an International Commission of Education. The dentists wanted to form a universal union of the nature of that formed several months afterward in the case of the *sociétés savantes* while waiting for the time when diplomats and governments should realize this union in all the branches of human activity, making the latter a compact entity. According to this decision, a meeting was held in Paris immediately after the Congress.

This year we have come to England to hold our second meeting. The welcome that has been tendered us, the prominent men that have taken part in our discussions, and the first results of our work show that the organization newly created by the Paris Congress supplies a necessity of our epoch, and that it will produce useful results for the advancement of the science of odontology. I have maintained that the meetings of the International Dental Federation attract the choice men of our profession. And indeed they are choice men,—those who do not hesitate to leave their families, their occupations, and their countries to discuss topics not of direct or immediate interest to them, but that constitute the problem of the education of their successors. Our *confrères* will certainly ratify the statements just made when they see the list of practitioners that have attended our meetings, representing sixteen of the most important countries of Europe and America.

As far as our labors are concerned up to the present, they have consisted mainly of an exchange of ideas in view of organizing and devising a plan of work for our future meetings. The more complex and important a body is, the longer must be its period of organization.

The birth of the new element of professional progress took place last year in the midst of great ceremonies, and in the presence of the most authoritative representatives of the dental profession of the world, in a meeting presided over by one of the greatest *savants* of the University of Paris, Professor Gariel, the delegate of the government. It has been the desire of the Executive Council that the second meeting, which constitutes for our International Federation a sort of scientific baptism, should take place with the same ceremonials, and for this purpose it has requested the eminent vice-chancellor of the University of Cambridge to stand as its godfather.

The Executive Council has honored me with the delicate mission of indicating the purpose that we are working for. Pardon me, gentlemen, if I confess to a feeling of timidity in having to address so distinguished an audience, in view of the knowledge and talent properly required for such a task. I shall, however, endeavor to fill any lack in those two factors by contributing all the good will or which I am capable.

Our work is one in which we have to deal constantly with difficult problems. In the first place we have the diversity of languages; this, however, is an obstacle easily overcome. There is another one of greater magnitude, brought about by the character of the different countries in which we live, by the difference in the legal conditions of their organization, and especially in their degree of evolution,—evolution which is in some slight degree the cause of our diversity of opinions. We must make great efforts and many mutual concessions in order to harmonize our national conceptions into the international plan which it is our wish should emanate from our discussions. A certain amount of work is also necessary, in order to set forth this program in such a way as to be understood and accepted by every one of us.

It seems to me that it is a daring act for me, the modest representative of a science as yet new, to stand here in this old university, before such distinguished professors, and talk to you on education,—that is, on one of the highest problems, even though it be limited to the training of young dental surgeons. Therefore, I have aimed to shelter my affirmations under the authority of men whose names and writings are highly valued in this connection. Two thoughts that I have borrowed from Michelet have encouraged me. One is that education is the first, the second, and the third part of politics,—that is, its pure essence; and the other is that in an advanced society teaching ought to be the function of almost every one.

While working at the preparation of this paper, my mind was impressed with the importance—for the future of humanity—of an Anglo-French combination. And so I consulted alternately the French and English philosophers. I went from Michelet to Herbert Spencer or Stuart Mill, and from Roger Bacon to Descartes, in

order to borrow from them the general principles which must guide us in the preparation of a national program of instruction in the midst of the contradictory ideas which are contending for the direction of public education. It has been through the inspiration of their principles that we are able to know the value of every science which is to be part of this program, and adopt a method of appreciation of their worth; and also in order to know the means of differentiating between studies having an intrinsic value and those having a merely conventional one, and between those that are valuable from the view-point of knowledge and those that are important from the standpoint of education and discipline.

We shall then understand better the difficulties of education in general, with the harm that can be done to the mind by the studies that may enter into the formation of a program or by the faulty order in which they are taught; also the necessity of proceeding from the concrete to the abstract rather than from the abstract to the concrete. It will be easier to understand the necessity of comparing these general principles of education with those that inspired the curricula of our schools, prepared empirically and according to the needs of the respective countries.

Among the general notions capable of directing us in our work, and that can be transformed into accurate proportions applicable to the teachings with which we are concerned, I will quote the following paragraph from the admirable work on Education by Herbert Spencer: "One of the conclusions at which we arrive is that in every branch of knowledge we must proceed from the empirical to the rational. A leading fact in human progress is that every science is evolved out of its corresponding art. It results from the necessity we are under, both individually and as a race, of reaching the abstract by way of the concrete that there must be practice and an accruing experience, with its empirical generalizations, before there can be science. Science is organized knowledge, and before knowledge can be organized some of it must first be possessed. Every study, therefore, should have a purely experimental introduction, and only after an ample fund of observations has been accumulated should reasoning begin."

It is curious to observe that this proposition of the English philosopher can be easily applied to the organization of dental education, such as has been very well understood by the different nations, especially by the United States, England, and France. In fact, in the English schools the apprenticeship of dental prosthesis precedes the special scientific and medical studies, which, in the evolution of the profession, is according to the historical evolution indicated by Herbert Spencer, and according to the principle of the subordination of the abstract to the concrete. We will endeavor to inspire ourselves with the principles of those great thinkers who have studied education in general, that we may apply them to our particular branch of education, whose purpose is to form good odontologists.

It is not an indifferent question, for the state and for the people at large, that odontologists should receive a rational education in

proportion with the progress of their special science,—an education capable of developing their qualities to their maximum.

It is not necessary that I should say anything to you upon the utility of the dental system for the preservation of health. At an epoch not very remote from this good teeth were an indispensable requirement of the soldier, who, however, had to open cartridges with his teeth. Progress in the military art has caused the disappearance of this practice. The state should by no means, merely for this reason, be indifferent concerning the organs under our supervision. The teeth are always necessary for the development of the child, as well as for the conservation of health in the adult. Dentistry should hence be in evidence in the school, in the army, and in all aggregations of human beings, as an important part of hygiene.

Likewise, it seems unnecessary that I should call the attention of dentists to the importance, for his dignity and for the position that he should occupy in the state and in the public estimation, that he should receive a complete and rational education, which would permit him to render to his fellow-citizens all the services within his province. A good education for the dentist is for the state a question of public interest, as it is for the dentists themselves a question of professional advantage. This for a long time has been perfectly well comprehended by our *confrères*, as can be seen by the papers on these questions that have been read at our latest professional meetings.

From the foregoing, it can be seen that the international union that we are endeavoring to bring about is useful and desirable, but the obstacles to which I have already referred, obstacles with regard to the laws, customs, traditions, the routine, the prejudices of every country, are numerous. There are others inherent to the conditions of evolution of odontological science, to which I shall refer only in brief. The odontological science, from the view-point of special science, is relatively a new one, at least it has been recognized as such only in recent times. Recent historical works show that in all refined communities, in Egypt, in Greece, in Rome, the dentist existed in remote times as a special practitioner.

At the beginning, when medicine was closely connected with the priesthood, the priest, and later on the physician, were able to treat the disorders of the teeth as well as those of the other organs of the body, but soon a different kind of treatment became necessary,—the prosthetic or restorative one, involving a mechanical art with which the physician was not familiarized and to which he was not sympathetic, according to the expression used by Dr. Kirk. It is this prosthetic art that gave birth to the prosthetic dentist.

The evolution of odontological science has taken place not without a certain amount of antagonism between these two kinds of practitioners; the physician, on the one hand, occupying himself with the purely medical phase of the diseases of the mouth, and the specialist of dentistry of the prosthetic phase, being a simple artisan at first, becoming later on the surgeon-dentist, having added gradually to his technical training in order to reach that step,—the

study of the medical branches directly applicable to the needs of his *clientèle*.

As Dr. Kirk has very wisely said, it is he who can be looked upon as the departing-point in professional dental evolution in all countries. It is by him and for him that this evolution has taken place. It is for him that in 1700 special laws were framed in France; it is for him that later on, in 1726, Fauchard, the father of modern dentistry, wrote the first special and complete work on dentistry. It is for him that in 1838, in Baltimore, Harris and his friends founded the first dental school, separate from the schools of medicine, after an interesting declaration of independence which can be considered with Fauchard's book as the *acte de naissance* and the scientific basis of odontological autonomy.

A certain number of dentists, holders of the medical degree, considering that medicine and dentistry should be indissolubly ligated, did not adapt themselves to the plan that dentistry should be taught and practiced as a specialty of medicine. And, as Dr. Kirk says, this opinion persists in spite of the success obtained by the dental schools in all the countries of the world, and also notwithstanding the fact that the separation between medicine and dentistry is becoming more accentuated from the standpoints of both education and practice. Some countries of Europe have followed this doctrine, and have arranged education and practice accordingly.

It is understood that according to whether one or the other principle is accepted, the solution differs as far as education is concerned. In fact, if odontology is considered as a simple medical specialty, as ophthalmology, laryngology, and gynecology, it suffices that the student should first conclude his medical education in a medical school, and then if he thought it necessary he would go for a few months to a dental school in order to familiarize himself with the technique of dentistry that he did not learn in the hospitals. In the second case the student enters from the beginning the dental school, where he completes his entire education, just as the student in pharmacy studies his profession in a school of pharmacy, with the addition, if necessary, of a few special courses at the school of medicine or at the hospital.

In order to cause the disappearance of the antagonism of these conceptions, and to dissipate the difficulties that they oppose to the progress of our teaching, it is necessary, according to Herbert Spencer, to bring to light the facts which have been accumulated in sixty years of teaching in the countries where dental education has been organized in an empirical manner; that is, according to the needs and necessities of the time. For this purpose, we have to make appeal to impartial statistics. This is the first part of the work of the International Commission of Education. This introductory work is important from the standpoint of the direction in which dental education should go, and also from that of the position that this teaching should occupy in the universities. But this question is not the only one that requires our attention; there are others, of secondary importance, it is true, but nevertheless questions which the representatives of both doctrines could discuss to

advantage and agree upon. Among these we should include the problem of the necessary preliminary education for the dentist.

On this question we also see the reappearance of rivalries of the classical and scientific education with regard to the utility of the mechanical and preliminary professional education, such as is given in the United States in the manual training schools, in France in the École Diderot, as adopted by the Paris Congress, and such as we see it in London in the Institute of Technology as organized by our friend Cunningham. We will also mention the question of the extent of the scientific programs, medical or technical, theoretical or practical.

In order to determine exactly the studies which should enter into the program, we must first of all determine the duration of these studies. It is evident that when the time shall come for the discussion of the quantity of medical sciences and of mechanical art that should compose the program of the future dental surgeon we will again find the partisans of the two opposite principles. But then one factor interposes itself like an arbitrator; I mean the duration of the course,—the number of hours that could be reasonably consecrated to dentistry. "Had we time," says Herbert Spencer, "to master all subjects, we need not be particular." To quote the old song:

Could a man be secure
That his days would endure,
As of old, for a thousand long years,
What things might he know!
What deeds might he do!
And all without hurry or care.

But "we that have but span-long lives" must ever bear in mind our limited time for acquisition. It is superfluous to declare that we must limit ourselves to the useful, to the essential; to the indispensable. "It is not necessary," says Descartes, "that the honest man should have read all books, neither is it necessary that he should have learned everything that is taught in the schools. Moreover, it would mean a mistake in his education if he had consecrated too much time to the study of letters; there are many other things to be done in life." Hence the time that it is possible to devote to study will be co-arbitrator with another factor,—the number and nature of the operations which the dentist is called upon to perform at the present time in the branches of operative and prosthetic dentistry and anesthesia.

Lastly, the results obtained in the different educational centers, with the different systems in vogue in America, England, France, Switzerland, Austria, Germany, and Russia, will also enter in this account. This is why the active collaboration of the men of all countries is necessary. Then we will see that by placing ourselves on an international standpoint all our discussions will lose some of their acerbity and intensity, and we will get rid of the irritating questions which often refer to minor considerations—mere words or purely local designations—rather than to real division.

By elevating the discussion to a philosophical standard, we shall agree that odontology is a science which tends to the preservation

of man ; it is a biological science. Hence it is perfectly possible to conceive, according to Professor Eliot, president of Harvard University, recently quoted by Dr. Kirk, a new university where the teaching of biological sciences would be established on a broad basis, so that all students, according to the purpose of their studies in relation to the profession chosen,—so that practitioners or savants, physicians or dentists, should be able to take up the fundamental knowledge which they would require while following the study of a specialty not taking up more than about four years, and concluding by obtaining the final diploma of doctor in this specialty.

Under such conditions dentistry, says Dr. Kirk, would have a place in medical education or, better, in the university, in proportion to the needs of its practice, and the antagonism to which we have referred would not exist.

But, no matter what the future reserved to this proposition is, in the meantime the discussions of the International Commission of Education will contribute to advance in our several countries the question of the position of the dental surgeon and of his education. We want to work for the benefit of our successors, and prepare the best program of intellectual, moral, and physical education. Besides, in this work there is a thought capable of giving us much satisfaction,—the thought of love of humanity ; and love, according to Auguste Comte, is the secret of human nature, the secret of the world.

We have applied to this work the principles of thinkers and of philosophers of whom humanity feels honored. By the welcome that has been tendered us we are assured of the support of the savants of this university. This is our encouragement, and also our reward.

This work is new ; it will have to be developed by others, and, as stated by that great man who went through this university,—Roger Bacon,—“Many will pass and science will grow.”

LUNCHEON.

At the invitation of the vice-chancellor of the university and with the kind consent of the fellows of Trinity College, the delegates were entertained at luncheon in the Fellows' Combination-room, Trinity College. Sir Michael Foster again presided, and, with the Regius Professor of Medicine and Dr. Cunningham as “croupiers,” at the conclusion of the luncheon said :

The autocrat of all the dentists, Cunningham, has issued a decree that there shall be no speeches at this luncheon. I understand you are going to have as many as you want this evening at the banquet, but we are to have none here. Still I think you would like me to convey on your behalf some words to the person who is the real vice-chancellor of this university. I am only for the time being the deputy vice-chancellor ; the real vice-chancellor I hope is fishing in Scotland, recruiting his health, which has been impaired by his many labors during the session. But I may say that I will convey to him on the part of you all your best thanks for the opportunity you have had in meeting in this old university, and also—may I add?—for the excellent repast, which I am sure he ordered in fear

and trembling, knowing how severe critics you dentists were in everything that concerns the mouth.

At the instance of Dr. Godon, the healths of the vice-chancellor and of Sir Michael Foster were drunk with acclamation, Dr. Godon remarking that the Federation had never been, and never would be, better treated than it had been that day.

CONFERENCE.

In the afternoon a conference was held in the Trinity College Hall, over which Sir Michael Foster presided.

The following address on "Dental Education" was read by Dr. Joseph Griffiths (University Reader in Surgery):

Sir Michael Foster and gentlemen,—I feel this is an occasion for introducing what I am about to say with apologies, because neither am I a dentist nor indeed do I know, except in very general terms, anything of the education of a dentist. But, as I have been asked to speak upon the subject now under consideration, I beg you will grant me that indulgence which you, tried by meetings and speeches during the last week, must be pretty well accustomed to exercise, and which I trust you will freely bestow upon me and the matter of my remarks. As, however, I represent the sister art of Surgery in this university, and am engaged in the teaching of the art, as well as the science upon which the art is built up, I may be allowed to have a small say in the matter of the education of the dentist. This subject is not new to me, thanks to Dr. Cunningham, who has on many occasions brought it before me for discussion on the main principles which should guide in the bringing up of the dentist. As I have said above, I know nothing of the work of the dentist except in a general sort of way, which I gather on the occasions when I seek his advice and aid, and all I can hope to bring to the discussion of this interesting subject is the *point of view* of the surgeon, who is in one sense the father of the dentist, he being even now capable by law of undertaking if he chooses the practice of dentistry.

Now, I believe I am correct in making the following statement,—that the dentists are divided among themselves as to the best means to adopt whereby they themselves can be best educated; and, broadly speaking, they are divided into two sections. To both sections, however, the desire to produce the best dentist is common, and each section naturally thinks it has found the right way. So far as I am able to gather and understand, this difference between the two sections may be expressed in the following manner: One section desires that every dentist shall be trained as a medical man is, and then take up dentistry; whereas the other section desires that a dentist shall be trained to his own profession from first to last. (Before we proceed any further, I think it would be well for me to state that all I am about to say applies to the average, and not to the exceptional dentist.) To emphasize this proposition, let us put it thus: One section desires dentists to be qualified medical men who have, as it were, taken up dentistry as an afterthought, and the other wishes for a dentist from start to finish. According

to the former, the man would be given a general medical education, and it can be estimated at nothing more, to base his future practice of dentistry upon; whereas according to the latter he would be given an education upon which his future work directly depends.

Is the education of a dentist to be that of a medical man with dentistry added on, or is it to be designed to meet his own requirements? is the question of the hour.

To help in the solution of this interesting problem, a brief comparison between the training of the medical man and of the dentist may not be out of place. In the case of a medical man the first half of his educational career is spent in gaining a complete knowledge of the normal man, and he takes biology, chemistry, and physics as introductory subjects to anatomy and physiology. This is done in order to give him a better understanding of the structure of the body in detail and of the functions of its several organs and tissues. The second half is spent in acquiring all that is known of morbid changes and abnormal functions, and in a training in the physical examination of any and every part of the human frame. In the earlier half, then, he is trained in methods adopted in the different subjects for eliciting knowledge, and in the second he is directed to employ the methods with which he is already familiar to determine as far as possible the physical condition of any or every part of the body.

On the other hand, in the case of the dentist the first period is spent in acquiring knowledge of the nature and of the mechanical properties of certain materials and in the training to perform accurate work, which must be done, so I understand, to a nicety,—a training similar to that of a mechanician. In the second period he is directed to acquire a general knowledge of the structure of the body and of the functions of its several parts; a minute acquaintance with the teeth and the jaws, and of the diseases they are liable to; with the application of the methods, already familiar to him, of dealing with the teeth in their morbid states.

Such I believe to be a fair general statement regarding the training at the present time of a medical man and of a dentist. Let us contrast the requirements of these two. The medical man requires a knowledge of the minute structure and of the functions of the whole body, but the dentist only a knowledge of the minute structure of the teeth and of the jaws, and a general idea of the rest of the human frame. A medical man requires only a general, but sound, idea of mechanical work, but the dentist a thorough knowledge of it, so that he may be able to perform his work with accuracy. A medical man requires a detailed knowledge of all diseased processes and their known causes, but the dentist a particular knowledge of morbid processes as seen in the teeth and jaws, and only a general idea of the morbid processes observed in the remainder of the body. Such a review brings out pretty clearly that the educational career of a medical man does not coincide with that of the dentist except in a few particulars.

Even in anatomy and physiology, in which their work comes nearest together, the dental student requires that which will give him a sound understanding of the teeth and their connection with,

and relation to, the remainder of the body, whereas the medical student should be familiar with the whole body. Of course, the more a dentist knows of the human body or of any other kindred subject the better he will be equipped generally, but not necessarily better furnished for the work of his own profession.

And if we go further and compare the surgeon with the dentist, we shall find that their work differs in a material degree. The dentist must possess many of the qualities that go to make a surgeon; he should have a quick perception, a keen insight, a sensitive touch, and be ever ready to act. But the skill of the dentist is largely, if not entirely, the result of that training in the mechanical department, so to speak, whereas the skill of the surgeon depends less upon mechanical training than upon accurate judgment to do enough and no more,—for in hardly any operation is it necessary for him to make a physicist's measurements and to adhere to them. Mechanical training has indeed been neglected in the education of a surgeon, and hence it is that we often deplore the mechanical knowledge and the reasoning built upon its deficiency as displayed even by surgeons of repute. This has been neglected, I imagine, because that skill born of judgment has been estimated so highly. Now, with the dentist it is just the reverse, for who can conceive a dentist who is ignorant of mechanical work?—but one without judgment may perhaps be occasionally met with. Thus the surgeon is at one end of the scale and the dentist is at the other, and doubtless it would be a good thing to improve them both, but in contrary directions.

Enough has, I hope, been said to point out that to make a dentist his training should be so arranged as to bring out his fitness for the work before him. A mechanical training of the best kind is essential to him, and must form the basis of his future work. In addition he requires a knowledge of the minute structure and of the function of the teeth, the material upon which he will have to bring his best mechanical skill to bear. I would therefore strongly urge you not to imitate the education of a medical student, but to continue on the lines which will train a dentist for his own profession from first to last, and to have a single purpose in view and to endeavor to obtain a definite result. Do not try to make a medical man a dentist, but let a dentist start and finish as such.

Can this education of a dentist be carried on side by side with that of the medical men? is the question of practical importance. I would unhesitatingly answer, No. The anatomist may train either, but he cannot train both together without giving one much more than he requires and not paying enough attention to the other. It is much the same with physiology. Therefore, I say their courses should be separate, and so arranged as to serve the right end. In physics and chemistry the same training might serve; in study of diseases, No.

Is such a course of study proper for a university to undertake? In my humble opinion it is and should be, for the work of the dentist is as honorable and as worthy of respect as that of any of the older professions, and I trust that the newer universities will take this line and have an avenue for dental students to obtain a

university degree side by side with the medical student. But I also trust the authorities will let dentistry and medicine be free to develop along those lines which each finds best suited for its own progress.

Although dentistry was once an intimate part of the medical art, it can hardly be so again, for its evolution has been so complete that it now forms a distinct and separate division of the art of healing. It is, I venture to think, a child of the old stock destined to continue an independent existence and to work out its own salvation.

At the conclusion of the address, and before the opening of the discussion, Mr. W. B. Patterson, the honorary secretary of the British Dental Association, entered the room, and was heartily welcomed by Sir Michael Foster.

Dr. BROPHY, Chicago, said that years ago he held views quite contrary to those he held to-day, but in the light of advancing education and the development of dentistry he had been forced to accept ideas that were formerly not agreeable to him. In the United States dentistry had its birth as a separate and distinct school of training; it was not from choice, but because the medical profession refused to give dentistry a place in their curriculum. At that time it was regretted, because it was wished that dentistry should be a part of the parent medical profession. But, independent schools having been founded, such branches of medicine were taught as the founders felt were necessary. The schools had now added, from time to time, departments until one who was not acquainted with all the medical curriculum might readily be led to believe that they were schools of medicine. It was recognized that in Europe the conditions were quite different from those in America. It was felt that it was impossible to make changes in this country, and in many instances it was quite impossible to make changes in America. The question, therefore, was how to prepare a man to do his work. He had the pleasure of sitting by the side of Sir Michael Foster at luncheon, and he put to him the question. He had a boy nineteen years of age just ready to enter the university; should he be prepared by a long four years' course in the university and then entered at the school of medicine for another four years' course or not? The answer was, "I would prepare him for his life's work. A student of medicine should devote his attention to the study of physics and chemistry and languages." Had he learned nothing more in his trip to Europe, he would have been fully compensated by that answer. He quite agreed with every word contained in the paper. The man who started out in life to prepare himself for any particular calling must have in mind that calling from the beginning to the end.

Dr. SIMS WOODHEAD (professor of pathology, Cambridge) said that every man preparing for his life's work underwent a certain amount of general training, a training to fit him for the specific work he had to undertake later; and he could not help thinking that perhaps the preliminary years of the dental student and medical

student might at any rate run on certain parallel lines. An attempt was made, how far successfully it was difficult to say, in the subject he had to deal with to give the medical student, as soon as he came from his study of anatomy and physiology, some inkling of the general processes of disease. The student specialized in the direction of special pathology, diseases of the nervous system, diseases of the kidney, and so on; but before he took this up it was absolutely necessary he should have a good solid foundation of the general processes of disease. That being the case, he could not help thinking it might be somewhat dangerous to begin to specialize at too early a stage, and whether it would not be better to study at any rate the general physiological and pathological processes, in order that in studying the disease of the special parts to which attention was to be devoted one might go to the very foundation straight away. From that point of view, he put in a plea for some common ground in the earlier part of the dentist's professional life. He recognized how much dental surgeons had contributed to the subject of bacteriology. In fact, the earliest experiments in bacteriology were carried out on material taken from the teeth. He quite agreed with dentists specializing in the later stages of their course and not attempting to be medical men or surgeons, because they wished to treat a patient for special diseases of special organs, and it was their duty to know far more about those than any medical man or surgeon possibly could know. Dentists were experts, and therefore required an expert training. Even the surgeon found it necessary to specialize, and anything outside his own work he handed over to a colleague. In that light he hoped no attempt would be made to make the dental qualification a medical qualification, but that it would be made something far better for the purpose than any medical or surgical qualification. The dental surgeon was a man specializing in a certain direction, who had built up his profession on a good, sound foundation of general physiological and pathological knowledge.

Professor HESSÉ, Leipzig, considered that the preparation for the dental profession was so different in different countries that it was almost impossible to fix a rule or a standard for the preparation in all countries. It was necessary to be guided by the point in view,—namely, the development of the art or profession which it was intended to practice, and the training should be such as was best fitted to secure that end.

Dr. AGUILAR, Madrid, said he was deeply interested in the proceedings of the Federation, because he was the first to feel the necessity of such deliberations. It was only a few months ago that in Spain the law for establishing a dental department in the University of Madrid was passed. Prior to that, there was no dental teaching, except what was given privately. He had the honor of being appointed to the chair of Dentology in the University of Madrid, and when he was called upon to propose the curriculum of studies he felt the necessity of learning the opinion of learned men,—and that opinion could not be better gained than through the Federation now assembled in Cambridge. He felt himself fully

compensated and over-compensated for the trouble of attending the meeting. He had no authority to express an opinion of his own, and he would only place in the hands of the chairman the following proposition:

"That five members be appointed to propose resolutions on the following questions and report at the next meeting:

"(1) What preliminary studies should be required for the admittance of students into the dental colleges?

"(2) What are the technical, theoretical, and manual studies the student should pass through before being allowed to practice dentistry?

"(3) What part of the studies taught in the medical colleges should be followed by dental students?

"(4) What are the most reasonable titles to be applied to the persons who practice the therapeutic and prosthetic treatment of the diseases of the teeth and mouth?"

On the motion of Dr. George Cunningham, seconded by Dr. Brophy, the resolutions were referred to the Committee of Education, with full power to act.

Dr. KIRK. It was said some years ago by a gentleman who resided not so many miles from this spot that the "evil that men do lives after them; the good is oft interred with their bones." But in what has taken place at this conference it seems to me we have at least one instance where the reverse of that proposition is true. If I have been able to correctly interpret the *motif* of the eloquent and scholarly address by Sir Michael Foster, to which we all listened with such deep interest, I feel that I do him no injustice when I recognize in it the practical application of the principles set forth by Mr. Herbert Spencer in his epoch-making essay on Education; or when I further recognize in it the spirit which animated the life-work of that man who, more than all others, I regard as the Nestor of dental education in England, Sir John Tomes.

I was told before I left America, and even since my arrival in England, that it would be quite useless to expect that anything which might be done as a result of the conferences of the Federation would have any effect in modifying existing views on the subject of dental education in Great Britain; and yet here in England there has been given out by one of her recognized educational authorities, and from one of her greatest universities, a statement of the principles of dental professional education the most liberal, logical, and reasonable which, in my judgment, has yet been uttered anywhere.

Like Mr. Spencer, Sir Michael Foster in his address recognizes the utilitarian character of professional knowledge and the inevitable conclusion therefrom, that education should, from the beginning, be adapted to the uses which the knowledge thereby attained is intended to subserve. He has, by keeping that central idea in view, cut the Gordian knot which for years has confused our discussions and thought on the relationship of dentistry to medicine. His statement that the dentist, within the limits of his activities, is a "healer" places the dental practitioner upon the basis of a natural

classification much more readily understandable than when he is regarded, either positively or negatively, as a medical specialist, for, lacking as we do an adequate definition of medicine, it is not yet possible to decide whether a dentist is a medical specialist or not.

The enthusiasm and unanimity of appreciation with which the address of Sir Michael Foster has been received clearly indicate the general acceptance which this representative international gathering has accorded to the views he has expressed. So evidently is that the case that it seems to me the further deliberations of this body may be most profitably confined to a study of the dental curriculum, or, in other words, to securing an arrangement of professional study in conformity with the principles set forth in the address, best suited to the education of the dentist. The best attainable curriculum is yet to be devised; the very fact that such marked differences are to be found in the curricula of dental colleges throughout the world is self-evident proof of the need for further investigation of the best methods for making dentists. It would simplify the question greatly if we should arrange all of the subjects now taught in all dental colleges into two categories: First, those which are essential, and, second, those which, though not essential, are desirable in the education of the dentist. We would then be in position, after having formulated a minimum essential curriculum, to provide for its continued expansion and improvement by the gradual inclusion of members of the category of desirables into that of the essentials.

Reference has been made to the importance of manual training as a feature of the dental curriculum, in order that there may be given to the student that high degree of manipulative dexterity without which he is unable to achieve success as a dental operator. We all admit the importance of manual training in dental education, but not all dental educators have clearly recognized an equally important consideration in that connection,—namely, the stage of development at which manual training should be undertaken by the student. I am not a physiologist, and I am glad to be in position to submit to the judgment of the distinguished physiologist, as well as educator, who is our presiding officer to-day whether it is not true that in order to successfully train the hand to a high degree of dexterity the manual education must be undertaken early in life, for a period quickly arrives in later years where such training becomes impossible. It was that fact which was clearly recognized by Sir John Tomes, and which he so energetically and practically advocated in his efforts at dental educational reform in this country.

We have frequent and familiar examples of an analogous state of affairs in connection with the use of the bicycle. It is quite possible for an individual after attaining adult years to learn to ride the wheel, but the later it is put off the more certainly does the unfortunate rider develop that anxious expression of countenance which in America we call the "bicycle face." The learner may in time know how to propel his machine, but in so doing he acquires infinitely more knowledge about every feature of the topography of the roadbed over which he travels, and never acquires that free-

dom and abandon begotten of the automatic muscular co-ordination with which the street urchin of a dozen years controls his machine. It is the necessity for manual training for the dental student in an early period of his career, when his muscular and nervous receptivities are at their maximum, that we find, in my judgment, the strongest argument in favor of a special curriculum for the dental student, and a sufficient reason why his special education should not be deferred until after he has pursued a standard course of medical training.

Professor Griffiths has referred to the importance of including the study of bacteriology in the dental curriculum. I know of no better illustration of the practical utility of a knowledge of bacteriology to the operative dentist than that embodied in the statement recently made by Dr. Black, of Chicago, in which he said, with reference to the preparation of cavities in teeth preparatory to inserting fillings, that "the margins of all cavities should be laid down upon areas of tooth-structure which are relatively immune to the attacks of the bacteria which cause dental caries, in order to prevent a recurrence of the disease."

If that axiom be true, and I think that no one can successfully question its accuracy, the evident conclusion must be that no man can intelligently and successfully prepare a carious cavity in a tooth for filling except he be fortified by a fair knowledge of bacteriology. I feel that we may congratulate ourselves as dental teachers and practitioners upon our good fortune in securing the encouraging and far-sighted statement of dental educational principles embodied in the able address of our distinguished chairman and of those who have followed him.

Sir MICHAEL FOSTER said, in answer to Dr. Kirk's inquiry, that for many years past he had urged that the education of the surgeon should not be delayed too long, because it was impossible after certain years to acquire that suppleness and dexterity of touch which was necessary for success. The mind grew old very slowly, and could be educated even late in life; but the body became old very soon, and it was necessary to train it while it was really young.

Dr. ROSENTHAL, Brussels, said that the evident conclusion of this conference was that nearly everyone was of the same opinion, and he thought that Sir Michael Foster had said that morning nearly all that could be said on the matter. He proposed that Sir Michael's speech should be translated into all languages and sent to all the bodies in the world interested in the matter. In Belgium there was a movement toward putting dental education into the hands of the medical man, but the basis upon which such a resolution was taken was a monetary basis. The medical profession was so overcrowded that they thought specialization in dentistry would prove remunerative and relieve the overcrowding of their profession.

Sir JAMES CRICHTON BROWNE was glad to have the opportunity of paying his tribute of admiration to the excellent address delivered that morning,—an address instinct with wit and wisdom, adorned by epigrams and similes, which would not be easily forgotten. Sir Michael Foster referred to the early training of the dentist at the

bench, and the subject had been further emphasized by the excellent observations of Dr. Kirk. Speaking from his own point of view, he attached great value and importance to the manual education of the dentist, and was inclined to attribute to that education a utility and significance that are not perhaps always properly recognized. Every surgeon knew that the movements of the hand were initiated in a certain group of centers of the middle region of the brain,—motor centers of the brain. But they were motor centers only in a special sense. They were not motor simply in the sense of sending forth impulses in response to excitations from without; they were motor in the sense of being the springs of movement, and they were receptacles in which was chronicled all the knowledge which the muscular operations put the man in possession of. The muscles not only obeyed the commands of the will, but they added infinitely to the information and intellectual acquisitions. The most cursory analysis of ideas revealed the fact that there were very few of them which were known purely by sensory impressions. The motor centers of the brain took an enormous share in mental life, and mental manifestations would be as impossible without them as would be the circulation of the blood without one ventricle of the heart. The highest possible functional activity of the motor centers was as important with a view to mental power as to muscular expertness, and the motor centers for the hand were very prominent among the motor centers of the brain. They were related to an organ which in its enormous combination of movements largely added to our intellectual resources, and it was evident that the highest possible functions of activity of those centers was of value in adding to intellectual grasp as well as adding to the expertness of the hand and to business success. But in order to have the highest possible functional activity of those centers it was necessary to have them trained betimes, and therefore it was necessary to give the student his manual training in dexterity very early in life; and by doing that one was not merely training the hand, but was helping to expand and develop the intellect.

Dr. GEORGE CUNNINGHAM thought the members would appreciate the results of the first general assembly in connection with the Federation, and he thought the discussion on education was a record which would be hard to beat. The Council had been authorized to appoint a Committee on Education, and he proposed, as a tribute to the success that had been met with that day, that the members should do something to promote the practical education of the public in dentistry. He proposed the appointment of a Committee on State Dental Service. It had been said at a meeting of the representative Board of the British Dental Association by a veteran whom he admired and respected for his past work, that he did not know what state dentistry was, and that he hated the word. State dentistry meant the utilization of the dentist's services by the state. The question of dentistry in the army never was settled. A war in Cuba was necessary to produce what was recommended before the war,—dentists for the army of the United States. Before the Boer war began there were dentists who as patriots

thought their best place and their greatest assistance was in utilizing their services for the state, but their services were rejected. Four dentists had been sent out to the front to look after nearly a quarter of a million men,—very capable dentists, but without much experience. What were those few among so many? Their services would be lost, and the danger would occur that instead of giving the men the benefits of conservative dentistry there would be a greater utilization of the forceps, which to some had ceased to be a dental instrument at all. He would not be content with the dental services accorded to the army at the present moment by the War Department as long as the dentists were made servitors,—unless there was a superior mind of a dental character to guide the work. He therefore proposed the formation of a committee to take up the subject.

The proposition was seconded by Dr. Godon.

Dr. J. LEON WILLIAMS thought the greatest work which the Federation could do was not so much to educate the dentists as to educate the public. He therefore asked the Federation to keep in view two things,—first, the harmonizing of dental teaching, which meant to keep in very close touch with the most advanced scientific investigation. There must be always a divergence of opinion as to all arts,—that was one of the conditions of progress,—but he felt there might be much more harmony in the application of scientific principles. A patient might go to one dentist who recommended a certain method of procedure, but if that patient went to another country or to some one else for the same thing, a totally different course was recommended. In the advanced stage of scientific dentistry that was not necessary, and therefore he thought a part of the work of the Federation should be keeping in the closest possible touch with the great scientific questions and the harmonizing of their views. Perhaps even more important than that was an attempt to reach the public in some way. There had been a great international congress held in London on tuberculosis, and there was hardly an opinion held by advanced authority on that subject which had not been expressed. Medicine and surgery were in very much closer touch with the public than dentistry, and that closeness of touch was brought about very largely through the daily press, a thing which dentistry as a profession had almost neglected. There was a most woful amount of ignorance on the part of the public as to the possibilities of modern dentistry, and that was because the dental profession had not done its duty in educating the public in modern dentistry.

Dr. FÖRBERG, Stockholm, as the hour was late, proposed that the subject should be discussed at the meeting to be held next year in Stockholm. He said he had taken the opportunity to give the general secretary the invitation for the Federation to meet in Stockholm, and he was also authorized to extend the invitation to the Executive Committee of the American Dental Society and the dental societies of Europe. Stockholm would do its best to welcome the Federation, but after the grand reception it had received in Cambridge he was afraid the best would be exceedingly difficult.

SIR MICHAEL FOSTER said the proposition of Dr. Förberg would be considered by the Council.

Dr. ROSENTHAL expressed his high appreciation of Sir Michael Foster's address, and said that, considering the importance of the questions therein discussed and the authority of the essayist, the address should be translated into the different languages represented in the Federation and sent to the different governments, professional associations, and schools that are interested in the matter of dental education.

A vote of thanks was carried with acclamation to Sir Michael Foster, and the conference concluded.

After the conference in the afternoon a garden party was held at Merton Hall, at which a demonstration of "Lon Goff" was given by Dr. Cunningham, Prof. Sims Woodhead, and others, and the interval before the banquet was spent in an exceedingly pleasant manner.

THE BANQUET.

A banquet was given to the delegates in the evening at Downing College. Sir Michael Foster again occupied the chair.

The loyal toast of "The King" having been duly honored, Sir Michael Foster explained that he held in his hand a sheaf of letters and telegrams from gentlemen regretting their absence, among them being Lord Rosebery, the Home Secretary, and Lord Alverstone.

Dr. BROPHY said that at the conclusion of the address delivered that morning his heart was filled with pleasure, and on listening to the other addresses it began really to overflow with joy. At the close of the afternoon he had found addressed to him a telegram to the following effect:

"Dr. Brophy, care Dr. Cunningham, Cambridge: Greetings from the Faculties Association of the United States to the 'Fédération Dentaire Internationale.' Notify the Federation that the Faculties of the United States have adopted the four years' course of instruction. To the 'Fédération Dentaire Internationale' we send greetings.—KENNERLY, Secretary of the Association."

The toast of the "Fédération Dentaire Internationale" was proposed by Sir Michael Foster, who said he was ashamed to confess that within a very brief period he did not know that such an important Federation existed. He gathered from the proceedings that day that the Federation came into existence only a year ago, and he supposed it had not yet cut all its teeth. But he felt sure from what he had seen that its teeth were absolutely perfect and needed no interference of any kind,—perfect enamel, perfect dentin, perfect cement, absolutely free from all micro-organisms, and, as far as he could see, it would never need the benefit of the dentist's art of caps and bridges, and things of that kind. For many reasons, he had full sympathy with the Federation. In the first place it had been his duty and his pleasure for many years past to take part in efforts toward international co-operation. He supposed he was a patriot and they were all patriots. He believed, as he was bound to believe, that an Englishman was God's best creation, and he had no doubt that on the other side of the water it was thought at a later period

the Almighty improved his first attempt when he made the Americans. It was for the advantage of the normal man that each type should work in concert together. There was plenty to separate nations. There were things of which the Americans did not know much, called newspapers,—newspapers which flourished by telling lies and sowing discord. Science, whatever was its branch, brought man to man and told him that he was his brother. Science alone could bring about that dream of the poet Tennyson, who spoke of the “battle-flag being furled in the parliament of Man, the federation of the world.” The *Fédération Dentaire Internationale* was one of the great means of the accomplishment of that possibly as yet far-off millennium. Then he had a personal interest in the matter. He too had, or had had, teeth, and he rejoiced in all improvements of the dentist’s art; and he felt sure that the Federation would bring about improvements in the manipulation of the masticatory apparatus even greater than those which had already taken place. And if he did not live to have his dentures put even in a condition more satisfactory than the satisfactory condition in which they had been for many years past since he had been under the hands of a member of the Federation, he trusted at least that his children would profit by the increase in the art. He associated with the toast the name of a gentleman whom he hoped now he might call his friend, although he had seen him for the first time that day, M. Godon.

Dr. GODON replied, expressing his belief that the Federation was not only for the benefit of the profession, but for the benefit of humanity at large. He spoke of the great debt of gratitude which the Federation felt toward Sir Michael Foster and the English representatives for their splendid reception in Cambridge.

The “University of Cambridge” was proposed by Dr. HARLAN, who said he felt that one of the things little dreamed of when the First International Dental Congress was projected was beginning to be realized. Before 1889, there was a small party in France, in the United States, and in Great Britain desirous of inaugurating dental congresses, and when the first little congress was held in Paris, in 1889, with three or four hundred members, representing eight or ten countries, it was felt that the small beginning might lead to something of great benefit to the world and humanity. The Second Congress was held in the United States, and last year, in 1900, the Third Congress assembled in Paris; and among the many things that the members of that Congress did was the creation of the “*Fédération Dentaire Internationale*.”

Prof. SIMS WOODHEAD responded to the toast. He characterized the University of Cambridge as a very liberal university, receiving with open arms all those whom it thought worthy of a good reception; and he was sure the members of the Federation had been very heartily received and welcomed most warmly. The Federation, he thought, had done very great things already,—among others, it had drawn an address from Sir Michael Foster. It had bridged over the interval between nations, and it brought men to work together in scientific and friendly relations, and it had instituted work which should lead ultimately to a very great advancement in dentistry.

Dr. HESSE, in proposing the health of the British Dental Association, thanked the association for the hospitality shown to foreign visitors who had attended its meetings, and coupled with the toast the name of Mr. W. B. Paterson.

Mr. W. B. PATERSON replied to the toast, which he said he was sure the British Dental Association would take as a great compliment.

Dr. HADERUP, in proposing the health of Dr. George Cunningham, expressed his intense joy at being in Cambridge and his thankfulness for the very splendid reception which the Federation had received. At present, he considered one name was inseparably connected with the University of Cambridge, the name of George Cunningham, whose jubilee the foreign delegates had an opportunity of celebrating that evening. George Cunningham was regarded as the pioneer in the profession, an international pioneer, —indeed, a true dental globe-trotter. His influence was felt everywhere, and not least in Denmark. As a motto for George Cunningham, he would wish to suggest, "One thing at a time." That might sound a little contradictory, knowing how many different ideas had come from the brain of their friend, but he would call to recollection a little English poem which said:

Work while you work, play while you play,
That is the way to be cheerful and gay;
Whatever you do, do with your might;
Things done by halves are never done right.

He thought those lines might be applied to their cheerful and courageous George Cunningham. In the name of the Dental Society of Copenhagen he presented a little jubilee paper to Dr. Cunningham which was especially interesting, and he finished by felicitating him on the fulfillment of one of his dearest dreams, the International Dental Federation.

Sir JAMES CRICHTON BROWNE supported the toast. He said he noted with great interest that day in Cambridge the representatives of many different nations showing their teeth to each other, but with no menacing intention. He could not doubt but that the conferences and congresses now so often held by men of diverse race and owning different allegiance strengthened the bonds of nations. They removed misconceptions, established understandings, and spun those little threads of personal attachment which when twined together formed strong cables of international friendship. The foreign dentists, he hoped, would go home convinced that the English were not distinguished by that long, fierce, wolfish development of the canine teeth which, according to a number of editors throughout the nations of Europe at the present time, were supposed to be characteristic. He thought it fortunate that the first meeting of the Federation was held in Cambridge, under the wings of a great English university, where for centuries the love of learning had been fostered. Dentistry, notwithstanding all that had been said, was best founded on a liberal education, and it should be pursued not exclusively as a bread-winning occupation, but with more scientific interest. In this country, and he supposed it was so in

other countries, dentists had been diligently striving to free themselves from unworthy associations, to perfect their skill, and to enlarge their knowledge, and he thought the time had come when the universities ought to take some notice of the efforts and recognize the legitimate aspirations of the dentists. There was no incompatibility between the most general, catholic culture and technical specialization; one was the best preparation for the other. The new University of Birmingham had determined to confer dental degrees, and no doubt other universities would follow in its train. It had struck him as interesting that there were seventeen colleges in Cambridge and seventeen different countries were represented at the Congress. With the toast, he submitted the name of Dr. George Cunningham. He did not know what part Dr. Cunningham had had in the formation of the Federation, but he was certain he had a finger in the pie, and also certain that he had stuck that finger in pretty deeply. Dr. Cunningham was a friend of his of twenty-five years' standing, and during all that long period he had recognized his immense and uncontrollable vivacity; and, as psychological physician, if he wanted any moral treatment for any patients of his laboring under melancholia he would put them for a short time under the treatment of George Cunningham. He had his attention drawn to a document of so cryptic a character that he could not understand it: "To George Cunningham on his jubilee, 20th June, and to the fulfillment of a dream of the 7th or 8th August." He had not the slightest conception of what it meant, but he had been told to direct attention to it, and he had no doubt the explanation would be forthcoming from Dr. Cunningham, whose health he asked the members to drink with the utmost enthusiasm.

The toast was drunk with acclamation.

Dr. GEORGE CUNNINGHAM, in responding, said there was a world of potentiality in the presence of "Michael Foster," and he was glad to have the opportunity of expressing to him his best thanks for what he had done that day, not only for the dental profession, but for the benefit of humanity. It was his desire to work for the benefit of his profession and humanity all over the world, and he cared not what the color of the flag might be. Although born a Scotchman, he was an internationalist. The result of his long experience had given him something like a sense of proportion, a thing which was of the utmost value to a dentist. The dentists were now going to combine, not for the interest of men who had their little bits of cloth which they desired to cut for their own purposes, but to combine solidly for the welfare and benefit of humanity. He had not the faintest consciousness of what he was doing when he went to see his good friends the Danes, but the Federation was the outcome of it, and he thought, far from being the fulfillment of the dream, it was only the dream just commencing. (Dr. Cunningham concluded his speech by running up a miniature Swedish flag, which he stated was to be the flag for next year at any rate, and sat down amidst an overwhelming outburst of applause.)

Dr. SAUVEZ, speaking in French, proposed the health of Sir Michael Foster, thanking him for the manner in which he had presided over the various proceedings of the day, especially for his address of the morning, which he characterized as an epoch-making one.

Sir MICHAEL FOSTER, before responding, read a telegram from Professor McAlister asking Dr. Cunningham to accept his hearty congratulations on his jubilee. There was another telegram from somebody at Peterboro, a great friend of Dr. Cunningham, regretting his inability to be present, and hearty felicitations from Professor Arkövy, of Buda-Pesth. There was another one from the Swedish Dentists' Society, sending their heartiest remembrances to the "champion of our front rank" on his jubilee day. There was also one from Paton, of Cologne, expressing the same sentiments.

Continuing, Sir Michael asked what he should say in reply to the toast. Around his little house, not far away, there was a garden, and in the garden there was a well. There had not been much rain for many weeks, and the gardener had been pumping at the well, but now the well was dry. The Federation had been pumping him all day long, and he was now quite dry. Dr. Sauvez had rained upon him many kind words, and those kind words would sink and perhaps later on descend and fill the well, but not that evening. He should always look back not only with pleasure, but with pride, to the part he had taken in that day's proceedings.

(To be continued.)

CLINICS AT THE THIRD INTERNATIONAL DENTAL CONGRESS, PARIS, 1900.

Dr. T. W. BROPHY, of Chicago, showed models of cases of staphylorrhaphy performed upon infants according to his method.

Dr. L. RICHARD-CHAUVIN, of Paris, showed three different kinds of bridges,—1, supported by roots; 2, supported by teeth, and 3, supported by teeth and roots. He also showed his apparatus for obtaining parallel abutments. He also demonstrated his method of making inlays with high-fusing bodies. He made two inlays, and adjusted them to the cavities to the satisfaction and admiration of all present. He also gave a clinic on non-cohesive gold, in order to show what an operator accustomed to work non-cohesive gold could accomplish in one hour. Dr. Richard-Chauvin made four gold fillings, requiring sixteen sheets of gold, in one hour, and besides gave many explanations during the course of the work. All these operations were made according to methods devised by the operator and followed in the École Dentaire for the past fifteen years.

Dr. WILLIAM DAVENPORT, of Paris, gave a demonstration of his method of making platinum bands. These he reinforces by melting platinized gold around them.

Dr. CECCONI, of Paris, gave a demonstration of his method of making seamless crowns. He showed how he could solder a gold-rubber attachment plate by keeping the rubber constantly protected with a wet rag. He also demonstrated his system of making combination plates of rubber and aluminum. His method produces plates of great lightness and strength.

Dr. N. S. JENKINS, of Dresden, gave a demonstration of porcelain inlay work, making an inlay for an upper left first bicuspid.

Dr. BRODTBECK, of Frauenfeld, Switzerland, demonstrated his method of producing anesthesia by suggestion and ethyl chlorid. He operated on three patients. One said that he did not feel any pain at all, the other two hesitated to make a similar statement. He used a glass inhaler. First he told the patient that he would not experience any pain, and then he poured from 2 to 3 gm. (30 to 45 grains) of ethyl chlorid in the compress of the mask. The conditions under which he operated were unfavorable, and yet one patient out of three did not feel any pain.

Dr. Brodtbeck explained the necessity of the operator's being known by the patient to be anesthetized.

Dr. LEVETT, of Paris, showed his method of filling teeth with tin and gold, which consists in placing successively a sheet of tin and one of gold, and finishing the filling with gold alone.

Mr. HOPEWELL SMITH, of London, gave a demonstration of his microscopical preparations at the bacteriological laboratory of the École Dentaire in the Rue de la Tour d'Auvergne. The sections which he exhibited showed the various kinds of adventitious dentin mentioned in his paper,—viz, areolar, cellular, hyaline, fibrillar, and laminar dentin. (See DENTAL COSMOS, vol. xlii, 1900, p. 1097.)

He showed one specimen in which, by staining, it was clearly demonstrated that the micro-organisms of decay had penetrated the new adventitious dentin and had entered the pulp, there producing inflammation; and the point was emphasized that "capping" an exposed pulp was, "as a rule," a practice to be avoided.

Dr. BONNARD treated an infected root-canal with chloroform. He first cleaned the neighboring portions of the tooth, and then proceeded to the canal, which he cleaned, and to which he applied chloroform dressings.

Dr. V. GUERINI, of Naples, replanted a lower left first molar attacked with penetrating caries. He extracted the tooth, then cleaned, filled, and replanted it. The patient did not feel any pain during the entire course of the operation.

He then performed another operation, which consisted in the extraction of the upper left canine and its subsequent replacement by a tooth that had been extracted seven years before, and which had been preserved aseptically up to the time of the transplantation. He used a silk thread to ligate it to the neighboring teeth.

Dr. E. K. WEDELSTAEDT, of St. Paul, Minn., inserted a gold filling in the upper right first molar according to Black's method. He prepared the cavity, finishing the margins with very sharp chisels. He then made an application of borolyptol, and began to place the gold. The clinician used the engine only to a very limited extent.

Dr. WEBER, of Paris, showed his method of inducing anesthesia by means of nitrous oxid and oxygen. He used The S. S. White Dental Manufacturing Co.'s apparatus, slightly modified. It is composed of two cylinders for nitrous oxid and one for oxygen. The escape of the gas can be regulated with the foot. He first gave nitrous oxid, using the oxygen simply as an antidote and to prolong the anesthesia.

Two persons were anesthetized: 1. A woman thirty years of age in 1 min. 6 sec., and a man twenty-five years of age in 1 min. 15 sec.

Dr. F. AGUILAR, of Madrid, showed a forceps with which he performs the operation of immediate regulation.

(Dr. Siffre remarked that he had performed successfully fifty operations of immediate regulation.)

Dr. JEAY gave a very interesting clinic on the technique of cocain anesthesia. He operated upon six patients; in four adults he used 2 cgm. of cocain in one per cent. aqueous solution; in a child he injected 2 cgm. of tropacocain in the same aqueous proportion. In an adult suffering from periostitis he injected 2 cgm. of cocain dissolved in vegetable oil. He referred to all the indications and contraindications to the use of cocain, and emphasized the necessity of not omitting the indispensable precautions of sterilizing the instruments, the solution, and the field of operation; of keeping the patient in a horizontal position if anemic or nervous, and of waiting five minutes from the time of the last injection before beginning the operation.

Dr. Jeay also demonstrated the use of ethyl bromid as a general anesthetic. He administered from 10 to 30 gm., according to the constitution of the patient. He emphasized the necessity of not carrying the anesthesia beyond the period of analgesia, and the uselessness of carrying it to the period of medullary excitement.

Dr. HAMONET demonstrated upon three patients the application of his new ethyl chlorid apparatus. Generally this substance is

used in the mouth with difficulty. By means of two metallic tubes attached to the bottle of ethyl chlorid and of a pair of bellows, he effects evaporation of the ethyl chlorid in a very fine spray. It seemed to be a simple and ingenious appliance.

Dr. YSSEL gave a demonstration of Dr. Christensen's method of filling teeth with blocks of porcelain. This method consists in adapting to the cavity pieces of American tooth-facings. The impression of the cavity is taken with modeling composition, and from this a facsimile of the cavity is made. After adapting the block to the impression, platinum pins are attached to it by means of glass powder.

Dr. MENG, of Paris, exhibited a patient in whom he had performed the operation of "jumping the bite." The mandible was carried forward by means of a simple inclined plane. The articulation obtained is normal, the jaw having advanced the width of a bicuspid.

"Dr. Talbot says that he has tried it many times, and that such a result is not possible. This is why I am glad to present to you this case. As all the teeth are present, it cannot be pretended that the upper ones have been carried backward."

Dr. DARIN, of Paris, gave a demonstration of his method of inducing anesthesia with nitrous oxid and chloroform.

This method, which prolongs the anesthetic period to several minutes, has been practiced solely by the demonstrator. The apparatus is composed of the regular gas inhaler, to which a drop-counting bottle is attached. The chloroform contained in the drop-counting bottle is allowed to fall drop by drop on a flannel compress, through which the gas passes. The dropping of the chloroform can be regulated by the operator.

He first allows the patient to breathe atmospheric air charged with a few drops of chloroform; he then gives nitrous oxid and chloroform until the stage of surgical anesthesia has been reached. He demonstrated plainly that the anesthesia lasts twice as long as when the gas is administered alone.

Dr. Darin assured his audience that the chloroform does not increase the danger of nitrous oxid anesthesia, which is justly considered to be the safest kind of anesthesia.

Dr. HERBST, of Bremen, gave a demonstration on the making of inlays with low-fusing bodies. After preparing the cavity the impression is taken with gold foil previously annealed. The paste is prepared by mixing plain porcelain or glass body with water, or preferably with alcohol. When the paste has been prepared, the impression is invested in a mixture of equal parts of plaster and pumice. To the water used in mixing the investment material, a small quantity of potassium sulfate is added. He uses a steel pen

to hold the investment, which is allowed to harden before the body is placed in the matrix. It is heated over a gas flame until the inlay becomes of a brilliant aspect.

He then made an amalgam filling with an alloy containing eight per cent. of gold. He used equal parts of alloy and of mercury, which he ground thoroughly in a mortar in order to make a homogeneous mass. He subjected this mass to a low heat, in order to insure more intimate combination, and then ground the mass again. Amalgam prepared in this way does not need to be squeezed in chamois skin.

The amalgam is packed into the cavity, and the filling is finished the next day, when freshly prepared amalgam is added. The advantages of this amalgam and of the method described are, first, that the filling does not need to be polished, and, second, the perfect adaptability of the amalgam to the margins of the cavity.

Besides this clinic, Dr. Herbst showed his method of making crowns, bridges, and many other useful devices. His clinics attracted the attention of a great number of dentists, who cordially praised his genius and skill.

Dr. R. E. PAYNE, of New York, gave a very interesting demonstration of the silver capsule implantation.

The operation was performed on a woman of twenty-five years, of frail and rather anemic constitution. The upper left first bicuspid was missing. A small fragment of the root remained in the socket. This he extracted after having injected five drops of a two per cent. solution of cocain on each side of the tooth. He then enlarged the socket by means of a Walker-Younger trephine, which made the size of the alveolus the same at all points. After this he selected a silver capsule, reduced it to the size of the trephine used, and fitted it in the socket for trial. He then made a groove on both sides of the socket, which he washed out and dusted with iodoform. After this precaution had been taken he placed the capsule in position and filled it two-thirds full of kneaded rubber. By making pressure against the rubber, the capsule spreads in the direction of every inequality and into the two grooves at the sides of the socket. It is not necessary to ligate the capsule, as it is held securely in place by its spreading. Into this capsule he fitted a crown with a porcelain root and set it with gutta-percha. After a few weeks' time this crown can be removed from the capsule and reset permanently with cement.

Dr. GOLDENSTEIN's clinic on buccal and naso-facial prosthesis was a most notable one.

Before bringing his patient into the clinic room, Dr. Goldenstein remarked that persons affected with facial deformities dislike to present themselves in public, and for that reason he would keep his patient in the room only a very short time.

He then said: I have replaced in this patient—1. A great portion of the anterior part of the maxilla. 2. The entire dental arch. 3. The roof of the mouth and the uvula. 4. A por-

tion of the face, with the nose and the superior and inferior meati; and, lastly, the lacrymal sac and canal. It is needless to say that in a case like this plastic surgery is unable to give any relief.

This extended loss of tissue is due to syphilis, which began in 1880. The upper part of the pharynx and the nasal apparatus have disappeared. A large cavity is present. The anterior portion of the spinal column can be seen. Through this large opening the movements of the pillars of the fauces can be observed. The olfactory sense is completely abolished.

Now, permit me to call your attention to the most important points in this restoration, in the buccal appliance, and in the naso-facial. The buccal piece, although perfectly adjusted, falls from the mouth, and it is only in conjunction with the nasal portion that the buccal piece is rendered immovable, thanks to a mechanism of great precision that I have devised for this particular case, which consists of two solid, flat springs of special form, somewhat like a cross, one lying in the direction of the nose, and the other in a transverse one. This terminates at either end in a golden disk. When introducing the naso-facial portion, the two disks descend and throw down on either side a supporting rod. We thus obtain two points of support, or, better, two points of suspension.

The antero-posterior springs, which are the more irregular ones, terminate in front by a little swaged gold plate of about one centimeter in diameter, with an anterior concavity in exact relation with the muco-labial region. This gives them a shape resembling that of the sella Turcica of the sphenoid bone. This plate accurately adapts itself against the cicatricial tissue of the anterior portion of the floor of the nose, and corresponds to the inferior nasal spine. The central portion of the naso-facial appliance is hard, but the periphery, which comes in contact with the tissues, is yielding, so as not to cause any pain to the patient.

Ever since 1880 this patient has been troubled with the lacrymal secretion; the tears would continuously run down over the cheeks, as on that side the lacrymal gland exists, but the lacrymal sac and canal have been destroyed. I have been able to remedy this inconvenience by means of a small sac made of gold, which I have accurately adjusted at the level of the gland. This sac terminates in a canal, also of gold, which traverses the meati, opening into the inferior meatus.

I will remark that, in spite of the many appliances that I have made since 1857, I have never found such a difficult case. I have never had to recur to the nasal fossa to support the appliance.

In order to avoid inflammation and separation of the mucous membrane from the overlying tissues, I directed the patient to massage the gums with the following preparation: Ethereal tannin, 4 gm.; vaseline, 40 gm. This treatment was instituted in order to "tannify" the mucous membrane. This was effected, for very soon the patient informed me that she felt the mucous membrane more dense and less sensible to the pressure of the finger.

I thought that it would be interesting to compare the weight of this appliance, intended to replace so considerable a loss of sub-

stance, with the weight of the portions of the same region detached from an anatomical specimen. With the assistance of Dr. Reiffel, chief of the anatomical department of the École Pratique, I have been able to make the following comparison: Weight of the lost natural organs detached from an anatomical specimen, 66 gm. Weight of my complete appliance, including the upper set of teeth, 52 gm.

The advantages that the patient has derived from the use of this appliance are the following: She can speak plainly, and without the inconvenience of the saliva running out of the mouth. She can masticate and swallow her food without any difficulty. I may also state that the appliance does not bother her in the least.

Dr. D'ARGENT gave a clinic on the production of anesthesia by refrigerants. He spoke on the properties, indications, and contra-indications of ethyl chlorid, and performed ten extracting operations, all more or less successful. In one of the patients the tooth to be extracted was in close proximity to one extremely sensitive to cold. He isolated the tooth completely, and produced the anesthesia without any difficulty.

Dr. PLATSCHICK gave a clinic on continuous gum work. He showed the different steps involved in the making of an upper plate.

Dr. BLEICHSTEINER, of Gratz, Austria, gave a clinic on the uses of cocain as a local anesthetic. He used a syringe composed of a body of glass and of canula shaped like the letter S, so as to make it possible to reach any desired point. He keeps his syringe upright in a glass tube which contains a few drops of alcohol, so that the needle of the syringe is constantly within this fluid. The solution he prepares in the following way: He dissolves 1 decigram of cocain hydrochlorid in 10 gm. of a 1 : 1000 solution of mercury bichlorid; this makes a 1 : 100 solution of cocain. The capacity of his syringe is 1 gm., hence every syringeful will contain 0.01 gm. of cocain. The clinician stated that solutions prepared in this way can be preserved for months.

The doctor makes first four horizontal injections at every angle of the tooth, and then two vertical ones to ascertain if complete anesthesia of the region exists. If necessary he makes two or more injections.

His first case was that of a lower right molar. He made six injections and extracted the tooth, the patient having felt some slight pain. The second case was that of an upper left molar; the operation was not successful, the patient suffering much pain.

Dr. V. H. JACKSON, of New York, gave a clinic demonstrating the Jackson system of correcting irregularities of the teeth and deformities of the jaws, showing models with apparatus for the expansion and contraction of the arch, and the movement of the teeth in different directions in typical cases of irregularities.

Dr. Jackson claims the following advantages for his system:

1. Simplicity and ease of construction of the appliances.
2. The system is applicable for all forms of irregularity.
3. It does away with the use of a plate covering the roof of the mouth.
4. The appliance is well retained against the teeth, causes no inconvenience, and does not interfere materially with pronunciation or with the occlusion of the teeth, even when an appliance is used in both upper and lower arches at the same time.
5. Although the anchorage is sufficiently firm for all practical purposes, the appliance can be removed by the patient,—an aid to cleanliness.
6. The force caused by the appliance for moving the teeth is controllable, and requires less attention than those generally used; thus there is a saving of time to the patient and to the operator.
7. The materials are spring gold, platinoid, German silver wire, and plate. They are easily manipulated, and the two latter are cheap and easily obtained.
8. A whole or part of the appliance can be made of the precious metal if desired.
9. The "crib attachment," "base wire," and spring construction, as shown in the specimens presented, are simple and quickly prepared, and changes and additions are readily made.
10. Gold or silver solder can be used for uniting the parts of the appliance, or the work can be simplified by the use of soft or jeweler's solder.
11. Many of the springs described can be used to advantage in combination with other means of anchorage, and especially with a metal or rubber plate.
12. Most any of the appliances can be continued in use for retaining the teeth in position after the completion of the regulating.
13. With this system, the model is not injured in making the appliance, and so may be preserved for future reference and study.
14. The mounting of the models of each case on a separate board for record, with a model showing the position of the teeth before regulating, followed with the appliance and the models showing the progressive changes, and finally models showing the corrected case.

Mr. G. BRUNTON, of Leeds, Eng., demonstrated the use of his Phantom in connection with the teaching of operative dentistry.

The Phantom consists of a modified copy of a skull in aluminum. The jaw and the mandible are removable, human teeth are fitted on, and are clamped to the mandible and jaw. The student or demonstrator is thus enabled to work on the phantom (which is fastened to the head-rest) as he would on a living patient. A filling on a crown or a piece of bridge-work may be made, and for close examination may be removed from its place by cutting out with a hot knife. The method of mounting teeth is as follows: A plaster model of a mouth is boiled in stearin, and when cold is coated with vaseline; an impression of the model is taken in modeling clay, which is mixed with glycerin instead of water; the teeth which are intended to be operated on are kept in water to which a few minims of formalin have been added, and they are selected and arranged in their order; the roots are coated with a solution of rubber in chloroform,—this gives the teeth when mounted a slight motion in the socket, such as natural teeth possess in the mouth.

The teeth, then being ready, are placed in their respective positions in the clay impression, the tray is placed over them, and the fusible metal is poured; when cold, the clay is removed and the jaw or mandible clamped to the phantom. The rubber face may be used if desired to embarrass the student. When not in use, the teeth should be kept wet, as they are more brittle when allowed to dry. The phantom is fastened to the head-rest by leather straps.

Dr. E. BURT, of Paris, gave a clinic demonstrating his method of uniting bands without solder.

Dr. TRALLERO, of Barcelona, Spain, gave a clinic demonstrating his method of immediate root-canal filling. After cleaning the canals and washing them with bichlorid solution he carries gradually into the canal a platinum explorer heated to a white heat; he then applies a formol dressing, directs a stream of hot air into the canal, and fills it with the following paste: Zinc oxid and xeroform an equal quantity, and eugenol sufficient to make a paste.

Dr. HARLAN, of Chicago, made a demonstration of the digestion of the pulp with papain, glycerin, and 1 : 300 hydrochloric acid. [This was based on his paper read before the General Assembly. See DENTAL COSMOS, vol. xlii, 1900, p. 1272.]

NEW YORK ODONTOLOGICAL SOCIETY.

A REGULAR meeting of the New York Odontological Society was held on Tuesday evening, March 19, 1901, at the New York Academy of Medicine, No. 17 W. Forty-third street; the president, Dr. W. W. Walker, in the chair.

The paper of the evening was read by Dr. G. ALDEN MILLS, as follows:

DENTAL CARIES A DISEASE.

At the last meeting of this society Dr. S. B. Palmer emphasized the view that dental caries is a disease. The late Dr. Tucker, of Boston, was a disciple in this line; he did not quite put it in the same phraseology, yet he hinted at the same belief. A multiplicity of theories have been published that have added but little, if anything, more than speculation. I do not need to detail them, for they are recorded in pages of published literature.

During the last quarter of a century a large amount of scientific work has been done that has created an increased interest in the minute anatomy of the teeth, yet all this has done little, if anything, to fix a settled knowledge of the real etiology of caries. That there will come sooner or later some concrete knowledge that will lead to a definite understanding of this much-perplexing problem I have no doubt. I think that too often in dealing with these subjects we are led away from the more profitable way of thinking by allowing individual prejudgments a place in our minds.

This is often seen as an outcome of some contentions leading to a spirit that deals in vehement personalities. Not uncommonly so strong will this contention become that wide breaks of fraternal association are the result. Such an atmosphere is not a medium for promoting the best results. Fraternal association has been so large a factor in the building up of dental convocations, we may need to be frequently cautioned for fear that in these days of high pressure for the gratification of personal ambition we may lose sight of the highest aim of a true professional association. We cannot fail to note that in the present day a spirit of commercial greed is fully apparent, and, so far as it effects the selfish aims it can but prove a decided barrier to real intellectual advance in the pursuit of truth, which alone can help us in intellectual attainments. We assume that it is *the* truth, not *a* truth, that is our aim and purpose, and nothing can help us that is not *en rapport* with the spirit of truth. Consciously or not, we are under a law that dominates the path of all true progress. There is but one source of knowledge, and, whether we recognize it or not, it will have obedience to its dictation. I think we can truly congratulate ourselves on the presence of so little of an antagonistic spirit during the late scientific offerings that have been presented both from here and from abroad, and we may be sure that we all are nearer together in agreement than many may think.

At this point of our paper we are led to ask whether few or any are pursuing their investigations on lines of the least perplexity. Man as man is always under limitations. There seems to be but little obstruction nowadays regarding an almost absolute definition in demonstration by the aid of the microscope. The greatest lack in our investigations is our deficiency in biological chemistry. In this direction let us hope that such investigations as those inaugurated by Dr. Michaels, of Paris, in the study of the fluids of the oral cavity will soon bring us face to face with knowledge long desired, so that a little more at least of the curtain of mystery may be lifted. We now assume that we will be compelled to turn for larger help for the unveiling of our confusion to the origin of disease in our physical organization. Nothing is more true than that we are "fearfully and wonderfully made." We unhesitatingly declare that the prevailing belief of materialism casts a shadow over the mental pursuits of nearly all investigators. This conflicts with the freedom of the mind. The natural mind is dominated too often by an inflexible will which proves a decided barrier to the larger access to the source of truth. More humility would open a clearer sphere of illumination that would lead to higher altitudes and give us a clearer view of real things. We think too low down in our motives, and too high up in our intellects. It will not be misapplied to say that if we would follow the scriptural injunction to believe with our hearts unto righteousness,—or rightness,—an atmosphere of generosity would surround us that would generate a spirit of helpfulness thought little possible. The physicists believe in nothing but physical manifestation. The spiritist goes farther, and recognizes the author of these manifestations. As an illustration of our

thought, the late Dr. Atkinson was an out-and-out spiritist. On this line he and Heitzman always split. Those of us who have had the privilege of the former's association know full well how he was often lifted into a sphere of illumination that was marvelous. The results in his writings in many directions emphasize the benefit of such a control of mind. We note here an example,—viz, his paper read before the state association on "Inflammation." We believe it to be a lasting monument of truth that will never totter or fall (see published proceedings, 1878).

By this time it may be thought that we have not as yet said anything of the subject before the mind. My desire has been to lead to a line of thought that is not much indulged in society discussions. How much I have succeeded may become apparent. Those of you who have, from curiosity or otherwise, read my article in the February number of the *International Dental Journal* on "Predisposition and Environment" may get a hint of my line of procedure in connection with this subject. Could we start with a normal standard of health, we could not find any basis for saying that dental caries was a disease; but we are forced to admit that predisposition in the human organization shuts out all possibility of there being absolute health; it can only be in a degree. We are firm in the conviction that ultimately it will be shown that Dr. Palmer's claim will prove a fact.

Those of you who are familiar with Dr. Williams's statement regarding predisposition and environment must see that it throws light in this direction that bears directly upon this claim. Most of us have the thought that environment comes only from local conditions manifested, as by neglect and the accumulations about the teeth. We say, Not so; the first cause of environment must be influenced by predisposition. This is made manifest along the lines of nutrition, producing a disturbed condition of nutrient action resulting in what we term malnutrition. This being a fact, it admits of the possibility of an unfavorable environment originating in the tooth itself. This, coupled with the more unfavorable environment about the exterior of the tooth associated with accumulation of foodstuffs, and added to all this *atmospheric air*, a fertile field is produced for bacterial development. We repeat what we have before said,—predisposition makes an unfavorable environment possible. Without it dental caries would not be possible. The fact is well known that there is a class of teeth that pass through a vast degree of unfavorable environment and are not touched by caries. We ask, Why is this? Because the predisposing tendencies influence more largely other portions of the system. This is often manifested in pulmonary diseases, where we find most beautifully developed organs untouched by caries. Again, we see a class of teeth that survive the most abject neglect associated in an environment of extreme filth or nastiness. Does any dentist doubt this is a field for bacteria? But they have no effect so far as destroying tooth-structure is concerned, and no caries exists. These facts are queries that are hard to get past and not count them as evidence that we are forced to look for other

causes than the local conditions. We cannot overlook the fact that resistance is a factor that defends the tooth against the invading foes that are inhabitants of this filthy environment.

Dr. Cook says, in the November issue of the *DENTAL COSMOS*, vol. xlii, page 1102: "*Bacteria alone cannot cause disease, therefore some other factor or factors must enter in.* While as yet we have not a clear conception of these factors, biological chemistry, which is now in its infancy, is throwing some light upon the subject, and we have reason to believe that future investigations along that line will demonstrate the connection between bacteria and certain biological-chemical changes which seem necessary for the setting up of a disease process by bacterial stimulation. At the present time our knowledge will not permit us to reason concerning the cause and effects of disease in the terms of an exact science, any more than we can at the present time interpret the phenomena of the cause and effect of life in a strictly scientific sense; yet we have a few facts out of which we may be able at least to construct a working hypothesis.

"First, we recognize in all life processes, whether normal or diseased, *an internal force* inherent in the protoplasm corresponding in the *inorganic world to potential energy*, which, under the influence of external stimulation, exhibits the property of irritability, which is the chief phenomenon of life. The property of irritability which belongs to all protoplasm (if explained by natural laws) is simply the manifestation of the chemical changes going on in the protoplasm by means of external stimuli, which results biologically in the transformation of potential energy into kinetic energy."

All of us are cognizant of the physical changes that occur at the age of puberty. Some teeth pass this ordeal victoriously, and some barely survive. Nutrient activities are enlisted in the highest degree to aid in the development of the organs most needing a supply. Too often at this period mental exertion is overtaxed,—a modern evil in our methods of education. There are helpful methods that could be put into practice, such as physical culture, which would to some degree aid in overcoming the disturbed equilibrium of physical activities during this critical period.

Right here we wish to quote from some discussions just noticed in the March number of the *International Dental Journal*, page 177. Dr. Roberts asks the question, "Is the enamel a lifeless or live tissue? If it is a live tissue it receives nourishment after it is once formed, and systemic conditions may affect it. If not, they can have no effect upon it, and the question then is purely one of environment. Whether the tooth is hard or soft can make no difference. It is simply that the environment is changed according to the systemic condition." Again, on page 178, "Dr. Black's belief is that tooth-tissues in themselves are not responsible for any predisposition to assume pathological conditions." Again, on page 179, Dr. Black is quoted to say that his "argument is almost wholly along the line of a systemic influence having to do with the beginning of the carious process, something operating through the oral fluids or saliva being the essential predisposing cause." Again,

it is said that by recent experiments of Dr. Michaels, of Paris, it seems that Dr. Black's suspicions are to be verified, and that the predisposing cause of caries is to be found in the oral fluids or saliva, which is contaminated with varying quantities with histochemical products due to physiological changes accompanying various conditions, the chemical products in turn influencing bacterial growth." We see distinctly that these quotations are all finger-points to help us in the line of thought before us. Dr. Ellerbeck, in closing the discussion, said, "It is being found that diathetic conditions are largely responsible for the predisposition of teeth to decay."

While we are deeply impressed that dental caries is a disease, we did not start to prove it, but rather to follow a line of thought that may be suggestive. We heard an ably written paper lately read before the One Hundred Year Club, in which the writer claimed, in an article on "Electrical Anatomy," that electricity *is life*. While it is a hard thing to prove or disprove, yet no one knows the analysis of life. I regard the age as one of hopeful expectation. One thing is certain, that what we do not know now we will know hereafter. That is a divine promise.

Discussion.

Dr. GEO. W. WELD. I believe Dr. Mills referred to Dr. Cook, who stated that bacteria are not the cause of disease. Did I understand him to say that?

Dr. MILLS. Yes.

Dr. WELD. Of course health is always comparative. There is no such thing as perfect health. We may think we are in good health, but there is probably one organ, or one particular part of an organ that is, functionally at least, continually out of order; so I think the doctor is perfectly right in that statement. So far as the *disease* is concerned, in reference to caries of the teeth and the *cause*, I presume he referred to bacteria as being one of the causes. I am very sorry to say I have not made a study of that subject sufficiently to discuss it, but I would be very glad to have some other gentleman add something to what Dr. Mills has already said in connection with the influence of bacteria on caries of the teeth.

Dr. S. L. GOLDSMITH. I think Dr. Weld misinterpreted what Dr. Cook said; not that I by any means agree with him. He said that bacteria themselves were not the cause, but there had to be besides a predisposition. Is that not so?

Dr. MILLS. Yes; it is secondary.

Dr. JOHN I. HART. This is a topic of infinite interest to all of us. It is a matter that we are dealing with every day, and probably the better we understand the actual cause of caries the more readily can we controvert its ravages. I think it is a fundamental principle that the causes of caries are both predisposing and exciting, and under predisposing causes it is well recognized that we have to contend with the local and constitutional causes, and then, reducing those local causes still further, we recognize the faults of structure, form, and position of the teeth. A tooth that is malposed, or wherein the developmental grooves are not properly united, is cer-

tainly one that is predisposed to decay. Traveling back to the constitutional causes, we have two different constitutional stages which will predispose to caries: one when the tooth is in actual calcification, if the constitution of the individual at that time is depressed by any one of the eruptive fevers or by any cause which will interfere with the nutrition of the individual, we have interference with the calcification of the dentin, which will produce those little interglobular spaces; or if we have an arrest of the calcification in the enamel, we will have roughnesses or pits in that enamel, so that in the actual formation of the tooth we distinctly recognize constitutional causes for its predisposition to caries. Still later, after that tooth has been formed and erupted, if the vital tone is depressed owing to illness or during convalescence, we have a period when the micro-organisms will multiply much more rapidly. Then the very make-up of the tooth,—the lime-salts that are acted upon by the lactic acid ordinarily would be destroyed by the excess of their product; just as we would be destroyed in a cell by the production of carbonic acid gas, so these lactic-acid-producing micro-organisms will be destroyed by an excess of their product; but this acid forms the lactate of lime, and they keep on multiplying. Vital tissue inhibits the introduction or the entrance of these micro-organisms; and that is right in line with the discussion that came up a few weeks ago at the Central Dental Association of Northern New Jersey,—the structure of the tooth being affected by the vitality of its pulp. If we have a tooth with a vital pulp to deal with, with the dentinal fibers supplied with nutrition from the pulp, they will inhibit the entrance of the micro-organisms; but if we have shrunken fibers, they will not. It is true that these dentinal tubules are only $\frac{1}{10,000}$ of an inch in circumference, but the microscopic body can enter into them. Owing to the death of the pulp, we have increased the possibilities for caries. There is no question but that the essayist has taken a proper position in this matter in assuming that the constitutional condition at the formative period of the tooth, and after the tooth has been erupted, has a great deal to do with the production of caries.

Dr. MILLS. What have you to say of the question of the life of the enamel tissue?

Dr. HART. I do not think there is any question (and I think clinical history bears me out) that enamel is vital, and I think we all realize that we do not need a total destruction of enamel to get sensation. The dentinal fibers bifurcate and enter into the enamel, and as soon as the enamel tissue is scratched we reach a point where we can excite the pulp with the enamel fibers anastomosing with the dentinal fibers.

Dr. WELD. Has it ever been demonstrated in the laboratory that bacteria of any kind can live on the lactate of lime?

Dr. HART. I do not think it has been asserted that they can, but it has been asserted that they would be destroyed in their own toxic lactic acid. This lactic acid is, if not entirely neutralized, at least its acidity is reduced by its conversion into the lactate of lime, and consequently, instead of their being destroyed in their own waste product, they thrive and increase.

Dr. WELD. I do not believe that any bacteria can receive sufficient nutriment to live on the lactate of lime. Furthermore, so far as my laboratory experience goes, the bacteria which destroy organic structure work from within outward, not from without inward. But I am only bringing this up as a question which I do not care to discuss at the present time.

Dr. HART. These bacteria thrive on the carbohydrates. They do not live on the lactate of lime, but the lime neutralizes the lactic acid and prevents their destruction. It is not contended that they live on the lactate of lime, but that the lactate of lime prevents their destruction in the excess of lactic acid. We all recognize that bicarbonate of soda is indicated where there is an excess of acid in the buccal cavity; probably that very treatment is the means of the lack of destruction of the micro-organisms themselves, although it neutralizes their product. Probably it would make no difference whether we permitted those individual micro-organisms to live or not, because if we inhibited their living others would take their place. They thrive on the carbohydrates, and not on the calcium lactate.

Dr. L. C. LEROY. I have been more than interested in Dr. Mills's paper, and I do not see but that most true thinkers and scientific workers must agree with Dr. Mills and those whom he has quoted in his paper. Dr. S. B. Palmer read a paper before the society last month upon a somewhat similar topic. Dr. Mills follows much in the same line, although he treats of the subject from a little different standpoint. Dr. Mills said that predisposition makes unfavorable environment. That bears so much truth that I think it might form the title of a most instructive paper. I doubt the correctness, however, of the assertion made by Dr. Hart that enamel is a living organ.

Dr. MILLS. My thought is of the enamel being a living tissue or a dead one. The sum and substance is in that. My thought is that dental caries is impossible unless by a diversion of the nutrient substance by constitutional disturbances. The general idea among the mass of dentists has been that local conditions were the only cause; that that was the only manifestation we had. Many take the thought that all diseases originate in a lack of nutrition, producing what we term malnutrition, and that makes a possibility of diseased action in the system, organic or otherwise. All these organs have a functional action which governs them, and in proportion as they are diverted from their regular mission, just in that proportion the nutrient action is taken away. Then, added to that, there may be something. I am not clear as to its character myself, but I am satisfied that the studies of Dr. Michaels, of Paris, which have been introduced in the Congress over the water, will throw light upon it that will show us that in connection with this there may be produced another disturbance occurring through the fluids of the mouth or surroundings which produces or makes possible the operation of fermentation, causing an unfavorable environment. I think the whole thing lies in that study or investigation, aided by biological chemistry. This, to my mind, is where we are deficient

as a profession,—in the chemistry of that particular department. If Dr. Michaels or any other man has the intelligence to go into that subject deeply, we might get at the secret of the whole thing. We have an intuition why we believe certain things, yet we cannot demonstrate it. At the One Hundred Year Club the other evening the suggestion was brought up that electricity was life. A physician spoke in regard to it, and said it is one of those questions you cannot prove in this world. But the man had that conviction in his mind. I think dental caries will prove to be a disease; just as much so as any of the ills with which we are afflicted.

Adjournment.

W. J. TURNER, M.D., D.D.S.,
Editor New York Odontological Society.

CLINICS AT THE UNION MEETING OF THE DISTRICT OF COLUMBIA DENTAL SOCIETY AND THE MARYLAND STATE DENTAL ASSOCIATION.

DR. H. S. ABENDSCHEIN. "Backings for crowns and bridges." He uses all his scraps of gold, keeping the 18-, 20- and 22-carat gold in separate boxes. Whatever carat backing he intends to use, he melts the scrap, making a button of gold, which, with a steel hammer, he flattens out so it will be thick at one end and thinner at the other, as thick or as thin as necessary for the case in hand. He then selects a facing, cleans off all the wax, takes a piece of paraffin sheet-wax and presses it on the back where the pins are on the tooth, then cuts off the excessive wax around the sides. He now lays this wax piece on the flattened gold button, and, with an excavator pointed for use as a punch, marks where the holes are to be drilled. He then carefully drills the holes and tries the tooth on to see if correct. If the fit is a little tight, he reams out with a punch. He then lays this drilled flattened backing on a flat Stub's file, and rubs it down to fit the porcelain back. He now puts it on the tooth and marks the sides, then removes it and cuts off excess with a pair of scissors if thin, or a fine saw if thick. He now takes 24-carat plate of 32 or 36 gauge and presses it over the pins with the thumb, letting it extend one-sixteenth to one-eighth inch. This he burnishes on to the back of the tooth and over the face, then puts the prepared backing on and bends the pins slightly together, invests in "sump," cutting all the excess of sump away, leaving only enough to protect the tooth while soldering. He also cuts away the sump from the backing side enough to expose the 24-carat gold slightly, so as to see where to solder. He then heats it thoroughly and solders only where the backing joins the 24-carat gold and around the pins; it requires very little solder.

This method will not check or crack porcelain facings. When cooled off it should be removed and finished. The 24-carat gold can usually be cut away with the scissors. If not, grind it away.

At the cutting edge the gold may be left, if it be desired that it shall have the appearance of being tipped. In attaching these finished backings and tooth to a gold crown, bevel the side next to the gold crown, wax and invest in sump, as above, and there is the beveled place only to solder.

Dr. LEVI C. TAYLOR, Hartford, Conn. "Clinical diagnosis of the striations on the gums." He endeavored to show how common it is for practitioners to fail to notice or comprehend the little striations in young people's mouths. Whenever these striations exist there is a cause, and that cause should be sought out and removed, whether it be a little nodule of tartar or a coating on the tooth. Both are very prevalent in civilized communities, and should be removed with great care and frequency. They are the starting-points of nearly every case of pyorrhea, and when properly cared for in a professional way we may avert the greater evil. There was another feature pointed out, *i. e.*, a dull purple red, commencing one-fourth inch from the gum margin and running into the cheek. The trouble can usually be removed by thoroughly cleansing the teeth and massaging the gums at frequent intervals. If this treatment fails you may be pretty sure we have or will have exostosis, especially when there are neuralgic pains in the temples, which usually connect back to the teeth. This trouble sometimes arises from an excessive crowding or the loss of antagonism, but nearly always will be accompanied by the heavy red or purple look in the gums.

He desired to impress upon those around him the necessity of thoroughness in their observations; also the importance of seeing the case early enough, so that they may be able to control it before the advanced or chronic stage sets in. He further pointed out the extension of coating under the gum, and tried to impress upon each the importance of removing the same by hand, it being impossible to do it with the engine; in every case where the engine is used it has proven a delusion and the work has been faulty. The nice touch of the hand is essential to the perfect result which all desire. It is far better to treat preventively rather than wait until the mischief is done and to treat as curative by patching up the teeth in their decayed condition.

Dr. R. G. HUTCHINSON, Jr., Brooklyn, N. Y. The operation performed was contouring a mesial corner of an upper left central incisor, the filling involving approximal, lingual, and labial surfaces up to about three-fourths of the distance from the cutting edge of the tooth to the gum margin, and extending about one-fourth of the length of the cutting edge. The whole filling was made with "moss fibre gold," and only hand pressure employed throughout the operation.

No claim was made for unusual rapidity of the manipulation of the gold, the advantage being in its extreme softness and adaptability, which makes malleting unnecessary and perfect adaptation possible, combined with cohesiveness, these enabling

the operator to build the contour by hand pressure exerted in all directions uniformly in a manner which cannot be accomplished so effectually with the mallet. At the same time the operation is much less fatiguing to the patient, as not even extremely heavy hand pressure is required to make the filling sufficiently hard and strong.

Dr. M. F. FINLEY, Washington, D. C., a demonstration by models of a method of opening the bite with cap-fillings without destroying the vitality of the pulps of the teeth. This method was original with him, and he first put it in use in the fall of 1896, and presented the matter to the National Dental Association in a paper in 1897. He has modified his procedure since then a little. At first, to build up the tooth with this filling he ground off the cusps or any prominences so as to make a nearly plain surface before stamping up a piece of pure gold plate to fit the occlusal surface of the tooth, next drilling holes in the tooth for pins and punching holes in the plate to correspond; he then soldered them in proper position, finally thickening the plate sufficiently to suit the case for the desired amount of opening of the bite. In molars he used four pins; in canines and bicuspid, three pins, avoiding the cusps in drilling the holes, so as not to jeopardize the pulp of the tooth.

Now as to the change made recently in his method: It is to take the tooth just as he finds it, and fitting the gold plate without any grinding of the tooth whatever, by stamping up on a die of Melotte's metal. He finds this more satisfactory both to patient and operator. All of these cap-fillings that he has used for opening the bite have been put on living teeth with very satisfactory results. By this method he avoids the excessive grinding which would be necessary to completely crown the teeth, or a very long sitting if filling were resorted to instead, in order to accomplish the raising or opening of the bite.

Dr. DAVID GENESE, Baltimore. "Prosthetic work." Repairing plaster models either wet or dry, handling plaster as if it were dough, using the new preparation, "cementine." He exhibited a number of casts in which repair of fractures had been made so that they could hardly be detected. He also exhibited a number of models with a new form of suction disks designed for upper and lower dentures, the principal feature being that the disks are in sections, so that no irregularity can exist on the model that is not met by the various forms shown, which are made of pure tin and depressed in a manner different from the Spyer's disks, are much heavier, and can be bent to the model without flattening the corrugations, which present an oblong depression in chain-like form running parallel with the plate length, and will sustain a great pressure without change.

Dr. P. E. BAIN, Washington, D. C. "A swaged open-face crown." His directions for making this were as follows: Take

a plaster impression of the tooth to be crowned in an S. S. White partial impression tray No. 20; fill in impressions of other teeth, if there be any, leaving the tooth to be crowned standing alone. Trim all overlapping parts of plaster from tray and allow to dry. When dry, place over the impression and tray a small rubber ring commonly used for dies in bridge-work, then pour the impression in Melotte's metal; allow it to cool, remove, and you then have a model of the tooth in metal. With a wheel bur go carefully around the metal tooth at the gum margin, cutting away the metal about the depth of the free margin of the gum. Smooth down with an inverted-cone bur. Now burnish tin foil around the tooth to secure a pattern by which the gold may be cut. Before swaging anneal the gold thoroughly. With a pair of pliers bend the gold about the metal tooth, and then burnish and swage to fit, leaving the ends overlapping at any point desired. Now carry it to the mouth, burnish about the tooth, trim and adjust. Remove and solder. Care should be used in polishing, as the crown is easily bent. He has swaged gold of No. 27 gauge, but thinner gold is preferable. The advantages of this crown are its simplicity and absolute adaptability so far as an open-face crown is adaptable.

Dr. JOSEPH HEAD, Philadelphia. "A method of inserting an amalgam filling with an oxyphosphate of zinc lining." Dr. Head did not claim that the method was new, but gave as his excuse for performing the operation that any method which would cause adhesion of the amalgam to the cavity walls was of such importance as to make it impossible to overestimate its value.

He prepared the cavity in the usual way, with clean, sharp edges and generous undercuts. The rubber dam was applied, and the amalgam mixed to a firm, stiff paste. The oxyphosphate of zinc was then mixed to the consistence of cream and inserted into the cavity, when the plastic amalgam was forced into the center of the cement and pressed to all portions of the cavity, thus squeezing out all the oxyphosphate except a fine layer that everywhere rested between the metal and the tooth-substance. The edges were then scraped and cleaned. The rest of the amalgam was squeezed dry of its mercury and the filling finished in the ordinary way.

In the course of his talk he also demonstrated how nicely a Donaldson nerve broach could be used to remove the excess of amalgam from the cervical margin of the cavity. This was done by rubbing the broach between the gum and the tooth and sawing upward until the surface was smoothed and cleaned.

He also showed his removable porcelain bridge made entirely of porcelain soldered to a double gold clasp that filled the vacancy in cases where the molars were missing with only the bicuspid remaining for abutment.

Dr. ROBERT GOOD, Chicago. "Pyorrhea." Dr. Good spent two hours removing deposits from an upper right first molar.

(Patient furnished by Dr. Hardy.) He prefers confining his treatment to a particular tooth until it is finished. After all deposits are removed he uses chemically pure nitric acid warmed to flood the pocket. All loose teeth should be held rigid while the healing process is going on. Three very important things in the treatment of pyorrhea are proper instruments, manipulative skill, and perseverance.

Dr. RICHARD GRADY, Annapolis, Md., exhibited a case of irregularity treated by the Knapp system. The patient, twenty

FIG. 1.

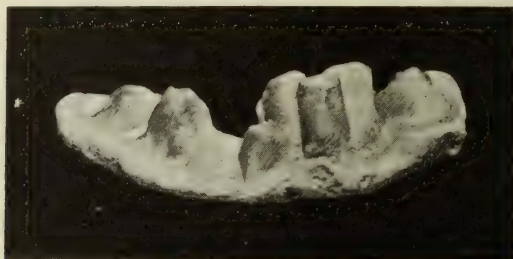


FIG. 2.

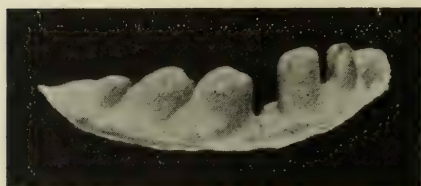
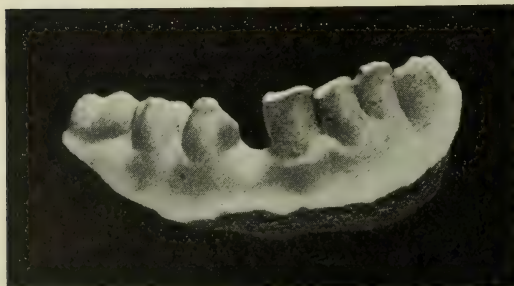


FIG. 3.



years of age, had had the lower right canine knocked out. Previous treatment elsewhere for four years included the extraction of one of the lower incisors. Fig. 1 shows the case, the incisors crowded together and the loss of the lower right ca-

nine. Fig. 2 shows the first movement; Fig. 3 the result at the end of six weeks, with no interruption to the work in the meantime; Fig. 4, the device used.

FIG. 4



He also showed a simple engine mallet for direct or back action, which can be used with foot-power or electric motor.

Dr. H. B. NOBLE, Washington, showed a number of cases of complicated irregularities corrected by the Jackson system of wires and cribs, and of lugs on bicuspid teeth instead of full cribs to secure firmness of fixture. He thinks the Jackson system of regulating the simplest and most efficient of all appliances.

Dr. S. LESLIE LECRON, Baltimore. (1) An extreme case of pyorrhea, which required heroic treatment. (2) Upper removable case of bridge-work held in place by mechanical means with accurately fitting springs. (3) Lower bridge of fifteen teeth with five attachments shown as a practical case of heavy bridge-work.

Dr. WILLIAM A. MILLS, Baltimore. "Arch or span filling." Dr. Mills demonstrated the use of this method when all other means fail of preventing the impaction of food between the teeth where the interdental spaces are abnormally large, or where the crowns of teeth approach their neighbors at such angles as to form V-shape spaces on their occluding surfaces. Where possible a V or X-shaped brace was used to add additional strength to the fillings.

The method is as follows: If on the approximal surfaces there are no cavities, he makes cavities, and prepares them as if for filling separately in the old way, being careful to make the anchorages as strong as possible, as they become the abutments of the arch when completed. He sets an orange-wood wedge firmly between the teeth and binds the two teeth together with fine German silver wire to prevent their spreading during the packing of the filling material. He then fills the space with oxyphosphate of zinc, mixed rather stiff, forcing sufficient cement over and against the buccal and palatal surfaces of the teeth to form a matrix. Before it sets too hard, remove all cement from the cavities in the teeth, and sufficient from the space to give

proper form to the arch and buccal and palatal surfaces of the filling, then proceeding to fill as if it were a single cavity. When the filling is completed remove the rubber-dam, matrix, wedge, and binding-wire, and then polish. He uses sponge or crystal gold to start the foundation or arch.

With an amalgam filling the *modus operandi* is the same, with the exception that gutta-percha may be used in the place of oxyphosphate of zinc. This and the binding-wire are not to be removed until twenty-four hours afterward, when the filling can be dressed and polished. He does not recommend these fillings for general practice, but only where necessity demands. (For further description, see DENTAL COSMOS, February, 1896, page 127.)

Dr. GEORGE E. HARDY, Baltimore, Md. (1) Illustrating the "Evans process of inlaying and lining platinum-and-gold crowns with porcelain." This process was first introduced by Dr. George Evans and demonstrated by him before the New York Odontological Society, October 17, 1899. Since that time he has introduced some improvements, and the clinic illustrated the method up to date. The advantage of the system is that it gives a method of crowning badly decayed bicuspid or molars whose pulps we may not wish to devitalize, without an unsightly display of gold.

The method is as follows: Prepare the tooth as usual and fit a seamless metallic crown, gold or platinum; then fill the crown with plaster and take an impression of the root by forcing the crown into place while the plaster is soft; or, instead of using plaster, Melotte's moldine or the white English modeling composition sold by Ash & Sons may be used. Remove the crown; if plaster was used for the impression varnish it and the sides of the crown; then wrap a piece of paper around the crown, letting it extend over the cervical end about an inch, as shown in A, Fig. 1. Into this paper and crown pour fusible metal. When cool the paper is removed and the metal die pulled out, representing the exact shape of the root inside the crown, as shown in B, Fig. 1. The impression material is then removed from crown, C, C, Fig. 1. The crown is ground thin over its labial surface as far as the porcelain facing is to extend. Replace it on the die; take a sharp knife and cut this thin gold entirely through at all points except at the cervical border, as shown by dotted line in B, B, Fig. 2. Burnish it in close against the die, and it will be as represented in C, Fig. 2. Next fill in the crown with the body, low-fusing if it be gold, or high if platinum be used. Replace the crown on the die and press it firmly to place. This packs the body closely and leaves the porcelain in the proper position inside the crown. Remove carefully from the die, and bake. The shrinkage of the porcelain will permit of an easy fit when the crown is returned to the die or the tooth. The labial section of the crown is then filled

in with the proper shade of porcelain and the firing repeated until the desired contour and color are obtained. (Fig. 4.) A sectional view of completed crown is shown in Fig. 3; A, A, being the fused porcelain. Other specimens shown are a canine

FIG. 1.

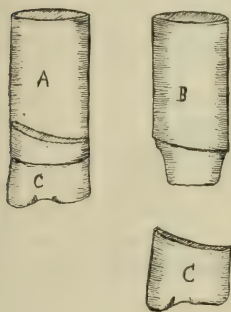
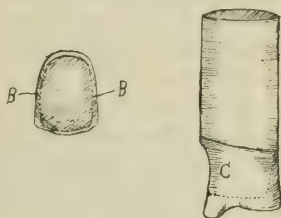


FIG. 2.



crown and suspended lateral, made with both gold and platinum. The process, if gold, was to fit the seamless canine crown, take impression and solder on the lateral with 22-carat plate, then cut out the face of the canine crown and fuse in the porcelain,

FIG. 3.

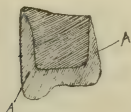


FIG. 4.



as above. In the platinum specimen the facing was baked in first, then put on the tooth, impression taken, and later ground up and soldered on with 18-carat solder. This is serviceable in cases where a live first bicuspid must be used to support a second bicuspid or canine dummy.

Dr. E. E. CRUZEN, of Baltimore, showed specimens of porcelain work to give an idea of some of the many practical things that are easily done with porcelain. Among these were inlay fillings, block sections made for special cases by using plain teeth and adding body and gum enamel, changing shape of tooth by addition of body, staining teeth, mending broken blocks, corners, etc., a unique way of replacing a broken facing on a bridge without removing pins, also a number of different kinds of crowns. A very interesting feature of the clinic were artistically carved molar and bicuspid crowns with nice blending of colors built up of body entirely, without using facings.

Dr. W. W. DUNBRACCO, Baltimore. The object of his clinic was to emphasize the value of the platinoid crown screw in restoring to usefulness badly decayed teeth by filling and strengthening roots for crowning. The root or roots are prepared in the usual manner with apical foramen or foramina sealed; then by means of long, narrow, flat-nose pliers one of these screws is easily and readily inserted, no matter whether it be a central or wisdom tooth under treatment. The advantages of such screws over the ordinary common iron screw so generally used lie in the fact that they are non-tapering, hence not likely to split the root, non-corrosive, will not cause discoloration of the gold covering them, flat-end, making insertions easy, quick and safe. They are superior to gold screws, because made of a harder metal; the threads will not dull, but will cut readily into tooth-structure. By means of these screws he has been able to restore to usefulness many roots that might otherwise have been extracted, and to securely fill molars and bicuspidis that might have called for crowns.

Dr. G. JULIUS SMITH, Baltimore. "Safe method of tipping teeth without checking porcelain." He desired to call attention to a simple method of tipping artificial teeth, for use in pivot crowns and bridge dummies, used in his practice, in which it is utterly impossible to check the porcelain. The method is described as follows:

(1) Grind the tooth to fit the case, beveling the cutting edge on the lingual surface.

(2) Adapt 24-carat gold, No. 35 gauge, to the back of a tooth, allowing it to extend about half a line's distance beyond the cutting surface; all other margins to be flush with tooth as usual.

(3) Carefully remove or tease backing from the tooth, so as not to alter its shape; paint surface of gold except the cutting edge with whiting, then solder on pieces of gold to the required thickness.

(4) Replace the backing on the tooth and approximate the pins with a pair of flat-nose pliers. By this means you will obtain a closely fitting tip and obviate the liability of checking the teeth during the process of completion.

NORTHERN ILLINOIS DENTAL SOCIETY.

THE Northern Illinois Dental Society held its fourteenth annual meeting at Joliet, October 16 and 17, 1901.

The following officers were elected for the ensuing year: C. J. Sowle, Rockford, president; J. E. Hancock, Joliet, vice-president; J. J. Reed, Rockford, secretary; M. R. Harned, Rockford, treasurer. C. J. Underwood, Elgin, member of executive committee.

Meeting in 1902 to be held at Rockford.

J. J. REED, Sec'y.

PENNSYLVANIA STATE DENTAL SOCIETY.

THE thirty-third annual meeting of the Pennsylvania State Dental Society was held at Ligonier, Pa., July 9, 10, 11, 1901.

FIRST DAY—*Morning Session.*

The president, Dr. S. B. Luckie, called the meeting to order on Tuesday, July 9th, at 10.30 A.M. The Rev. N. G. Miller, of Ligonier, invoked the divine blessing, and Rev. R. L. Smith, of Ligonier, then delivered an address of welcome.

PRESIDENT'S ADDRESS.

The president then read his annual address, and said in part:

With all our achievements there is an unrest, an activity characteristic of human life. Social and economic conditions are clamoring for a change. This is well, for motion denotes life; stagnation death. There are present problems to be solved and a future history to make.

With the history made by dentistry in the last century, it is entitled to credit and honor equal to those of other callings. Its goal, however, has not been reached; questions of importance, requiring judicial thought and conservative action to determine an eventful future, are to be solved. Foremost among these is education to fit the recruits for study and practice; the perfection of laws to protect the public against incompetence, and also to establish reciprocity between the different states; and a more complete association for the purpose of improvement, representation, and fraternal brotherhood.

Education. The problem of education is a vast one. The fitting of the young by mental, manual, and moral training that they may perceive accurately and think correctly, manipulate intelligently, and use knowledge so as to help others, requires regulations and laws in consonance with the desires and demands of the times. How these may be established and adjusted so as not to conflict with liberties already confirmed and disarrange social conditions to such an extent as to thwart the true purpose and intent makes training for the duties of life a science and an art. Says Spencer, "The highest function of life yet known to us is clear consciousness; the most elevated content of consciousness is knowledge, and the most obvious and immediate aim of knowledge is constantly to procure better conditions of life for the organism; hence to preserve its existence as long as possible and fill it with pleasurable sensations. In order that the collective organism may be able to perform its task, its constituent parts are bound to submit to a severe hierarchical order."

The preliminary education required of those purposing to enter dentistry is in the ascendancy, and its character and quantity demands attention. The common schools furnish education to the masses; they are the feeders for all occupations, from the most humble, requiring but little intellectual ability, to the highest, whose intellectual and moral attributes should be of a high ideal. Is the

character of the teaching in the common schools such as to prepare for higher callings of life, especially the technical? and at what time in the educational process of the individual is he prepared to enter that which is to be his life-work?

The National Association of Dental Faculties requires that the minimum preliminary education for entrance to colleges belonging to the association shall be a certificate of entrance into the second year of a high school, or its equivalent. The Dental Council of Pennsylvania adopted the rule that a preliminary examination in lieu of a certificate should be required in arithmetic, grammar, geography, orthography, American history, and English composition, the extent and scope being inferred from Acts of Assembly as to what constitutes a common-school education.

This required standard may be an advance over the educational qualification of the average individual who elected dentistry as a livelihood in the early years of the last century. Is not dentistry, however, a calling as responsible and difficult as any, too far in the rear in educational requirements, when companies and corporations organized for the purpose of developing industries are absorbing the products of technical schools that require a diploma from a high school having a four-year course, or its equivalent, to enter, to be followed by a four-year graded course before coming up for graduation? If mining, civil, mechanical, electrical engineering and chemistry require such high order of preliminary education to train the mind to pursue the prescribed necessary course in college, should not dentistry, within whose field are yet unexplored regions and unexplained causes, demand that it be brought abreast with other callings involving science and art?

The operative technique and studies that the practice of dentistry suggests are exacting. Our progress in technique has been rapid and sure in the last decade, more than in the opportunities to acquire knowledge in the abstract sciences. Let us hold fast to what we have and improve it as much as possible, that the practitioner may have the finger-skill that is necessary; but also strive for that necessary preliminary mental training that will induce and make it easy to take excursions into the collateral territory that surrounds dentistry. As the requisite preliminary training has a bearing upon the teaching in the common schools, the dental profession should use its influence and agitate for a curriculum that will qualify and adapt mind and hands for it and other technical callings.

Following preliminary training is the question of college training and the length of time to give to students that they may be best fitted for the demands that will meet them when they become practitioners and representative members of a profession. Shall it be to extend the time to a four-year course, or shall it be a medical education along with the present operative and prosthetic teachings?

If the future field for the dentist is to be the oral cavity and the recognition of manifestations of lesions therein as concomitant to physical defects elsewhere in the organism, the training must be extensive. To understand the physical conditions of the fluids, the tissues, and organs in the mouth and surrounding it, and the devia-

tions from normal in the general system that produce expression therein will demand extensive study in bacteriology and chemistry. If the equipments of the dental schools are insufficient to instill such knowledge, are the medical schools sufficiently equipped, or is there on the part of those who have them in control an ambition to make opportunities whereby students may become proficient in dental manipulative skill and be trained for the practice of stomatology?

If the knowledge is to be stomatology, there is work to do that may mean the passing of the dental college; and if this is so, it also means the reorganization of medical education to meet the requirements. Will a just pride forbid the former? Will a zealous profession rise to the emergency and make the special degree a badge of broader culture? If the dental college is to be the *alma mater* of the stomatologist, it should receive support from the state. It is the inherent duty of the state to not only protect its citizens against incompetence, but assist in educating and qualifying for proficiency those who endeavor to prevent and cure disease. The state should be appealed to for an appropriation for the purpose of equipping and maintaining laboratories for scientific work, and relieve the college from the necessity of commercialism for maintenance.

Law. As social conditions become complex, natural and revealed laws are insufficient, and it becomes necessary for the constituent parts of the social organism to be subjected to a severe hierarchical order; rules of conduct had to be established by a higher power than the individual. The state assumed the right, in order to protect the whole, to restrict the individual. So down the line of evolutionary process we have statutory laws enacted for this purpose. As dentistry in its expansion for knowledge became also better prepared to serve the public, the state assumed its authority, and debarred from accession to the ranks those whose opportunities or desires prevented the acquisition of modern skill and knowledge. With this dictum from the state, however, conservatism was shown, and protection was given those who had prior to the enactment of the law been in practice a specified number of years; they were not required to show any prescribed evidence of proficiency.

The efforts to have dental laws enacted, though originating from representative organizations composed of dentists, were entirely free from any desire for pecuniary advantages, the promoters being prompted by an affection for a growing profession with promise of great possibilities, and a desire to give humanity protection in its endeavors in seeking relief from discomfort, deformity, and disease. The law is for the public, 'tis theirs for protection.

A new law, though at first a vague proposition, becomes, by supplements or a new law to take its place, more specific, and after interpretation by judges of courts of justice reaches definiteness. The present law of Pennsylvania has reached the courts in two cases. In both the law was sustained.

Association. The object of association is to create fellowship, and it tends to establish homogeneity and solidarity among men; its noble purpose is the advancement of their interests and enlighten-

ment, work and influence, for the betterment of mankind. The history of association demonstrates that in union there is strength. The formation of dental societies marks a transition from charlatanism and empiricism to professionalism and science. They emulate, diffuse, and are the representation and strength of the profession in district, state, and country in which they exist. The number of members and their loyalty in any state society is the exponent of the influence the profession possesses in that state for a good and efficient law, its enforcement, and for educational requirements.

Education, laws, and association are the three wicks to the flame of life of the profession; extinguish either one of them and the other two are helpless to sustain vigor and health.

A closer relationship between the profession and colleges would be well to cultivate; loyalty to one's *alma mater* and a perpetual interest from college to alumnus would work much to keep the professional line intact.

Many young men enter college without having a very extended conception of the philosophy of morals and how to apply them to business. The concern for the individual being paramount to those duties relating to the fraternity or the public, and the time of the faculty being perhaps crowded in preparing for the practical work, but little opportunity is presented for teaching the moral conduct that becomes a professional man. Much could be done by establishing a chair of ethics, but, as educational institutions must be conducted upon business principles and a watch be kept on the revenue and outlay, the essentials have to give way to the necessities. To overcome this condition until the time shall arise when it will be possible to have these essentials taught, voluntary contributions to the colleges in time and talent might be made by members of the profession.

My attention has been called to the vague and inaccurate teachings contained in the text-books of the common school on the anatomy and hygiene of the teeth. As an illustration, one book edited by a person with the affix of A.M. and M.D. to his name gives the following: "The teeth are bony pegs set into the jaw-bones. Those in the front part of each jaw are sharp, so as to bite lumps of food. Those in the back part of the mouth are flat, so as to grind the food to pieces. Between the ages of six and thirteen the child loses its first set of teeth and gets a whole new set and eight additional ones. Through the center of the tooth there runs a small tube which contains a nerve and a blood-tube. The outside, the part above the jaw, is covered with a very hard substance called the enamel, which protects the other parts from decay and injury. Biting hard things, such as nuts and wood, often breaks the enamel and causes the teeth to decay. When the decay reaches the nerve, the tooth aches and becomes very tender." This is followed by instructions as to the care of the teeth, which is about as edifying.

The State Society, in conjunction with local societies, might make an effort to correct such false teachings. If the public is to be instructed in the anatomy, structure, etc., of the teeth, it would be well to have the book to be used reviewed by a dentist competent to do so.

An appropriation of five hundred dollars a year should be asked to defray the expenses of the Council.

At the conclusion of the reading of the president's address the chairman, on motion, appointed a committee of three members—Drs. S. H. Guilford, W. D. De Long, and E. P. Kremer—to consider and report upon the address at a following session. The balance of the session was devoted to the transaction of business.

FIRST DAY—*Afternoon Session.*

After the transaction of routine business the following communication was read by the secretary:

NATIONAL DENTAL ASSOCIATION: OFFICE OF SECRETARY OF COMMITTEE ON "ORAL HYGIENE IN OUR PUBLIC SCHOOLS."

To the President, Secretary, and Members:

FELLOW PRACTITIONERS: At the annual session of the National Dental Association held at Old Point Comfort, Va., July, 1900, the following resolutions, offered by Richard Grady, M.D., D.D.S., were adopted:

"*Resolved*, That a special committee of five be appointed by the President to consider the expediency of inaugurating steps looking to the co-operation of the public schools in teaching 'Good Teeth, Good Health.'

"*Resolved*, That said committee report the result of its deliberations to this—the National Dental Association, at the earliest practicable moment."

The committee, to which was given the name Committee on Oral Hygiene in Our Public Schools, was accordingly appointed by the President, B. Holly Smith, D.D.S., M.D., as follows: Richard Grady, D.D.S., M.D., U. S. Naval Academy, Annapolis, *Chairman*; H. Herbert Johnson, D.D.S., Macon, Ga.; I. P. Wilson, Burlington, Iowa; F. W. Stiff, D.D.S., Richmond, Va.; Wm. Ernest Walker, D.D.S., M.D., Pass Christian, Miss., *Secretary*.

The first work undertaken by the committee will be to gather statistics regarding the frequency of dental caries and other abnormal conditions of the mouths of school children in the United States. In order that the committee may be enabled to make a report at the next annual session of the association, you, as a dental society, through the proper official, are respectfully requested to communicate to the secretary of the committee, at the earliest moment after reception of this communication, what has been done, and what is being done, in the towns and cities of your state or vicinity, to promote Oral Hygiene among the children in the public schools.

We have no accurate statistics of this kind respecting the school children in this country, and reliable information can be secured only through detailed examinations and reports. Many points of real scientific value could, we believe, be settled by systematic examination of the mouths and teeth of the juvenile population.

As an illustration we give here the results of the careful examination of the mouths of about 20,000 children in Germany, of ages ranging from 6 to 15 years, 95 per cent. of whom, as you will note, showed dental caries. It was also shown that there were in the whole number of children examined, 372 anomalies of different characters, including harelip, cleft-palate, irregularities, V-shaped jaw, etc.

Extract from percentage tables of children examined: Number examined, 6 to 8 years, 6060; 9 to 10 years, 3518; 12 to 15 years, 5157.

With perfect teeth: 6 to 8 years, 407 (3.8 per cent.); 9 to 10 years, 268 (3.4 per cent.); 12 to 15 years, 172 (5.5 per cent.).

Percentage with caries: 6 to 8 years, 93 per cent.; 9 to 10 years, 96.6 per cent.; 12 to 15 years, 94.5 per cent.

It is the design of the society making the examination above quoted, to present a copy of the results of its labors to the German government, in the hope of obtaining national aid in the further prosecution of this work.

We want children instructed in the care of the teeth and mouth; taught some system of oral hygiene. Young minds are very susceptible, and they would readily understand, if properly taught, the serious results liable to follow the neglect of their mouths and teeth. Believing that your society has a full appreciation of the importance of this subject, and that you realize the full value of the results sought to be obtained, may we not hope that you will cheerfully co-operate with the committee of the National Dental Association, either as individuals or through a committee from your society?

Statistics tabulated from a very large number of examinations cannot fail to show most interesting results, of scientific value, to which we hope you will promptly contribute your share.

If in the furtherance of this work you will arrange to have made a systematic examination of the teeth of the children in the primary and grammar schools of your section, whose ages range from 6 to 15 years—a sufficient number of examination blanks and diagrams (such as we desire to have used for uniformity) will be sent you at the expense of the National Association, to supply each dentist promising to make the examination, under your auspices, of the children in one school, or in one room of a large city school.

Hoping that you will give this matter the consideration it deserves,

I am, on the part of the committee, yours truly,

(Signed) RICHARD GRADY, *Chairman.*

WM. ERNEST WALKER, *Pass Christian, Miss., Secretary.*

The secretary also read the following report from the Reading Dental Society:

REPORT OF THE TEXT-BOOK INVESTIGATION COMMITTEE OF THE READING DENTAL SOCIETY.

On various occasions papers were read relating to the necessity of better public dental education. Recently a paper was read before the Reading Dental Society which contained an account of the existing condition of the dental literature in the text-books of this city,—viz, Reading, Pa. The paper was thoroughly discussed and the subject thought to be a timely one. At a subsequent meeting the President of the Reading Dental Society appointed a committee of five to investigate the condition of the dental literature in the text-books throughout the state of Pennsylvania.

The committee have found the following condition, in the following manner: A letter of inquiry (stating what information was wanted) was sent to fifty-two dental surgeons throughout the State. Nearly all of these were members of the Pennsylvania State Dental Society. The letters were so distributed that one was received in nearly every county. In reply to the letters of inquiry we received eighteen letters and postals and three text-books. The nature of the information varied; some stated the existing conditions, some sent the names of the text-books, while others sent copies of the chapters on the teeth, etc. All seemed to be favorably impressed with the idea, and some expressed themselves as thinking that we were in a field of good work and hoped for its ultimate success.

After a thorough investigation of all the literature at hand it was found that all the physiologies were vague both in the description and the care of the teeth. A tabulated statement of some of the mistakes are as follows:

(1) *Overton's Physiology.*

In a young child the two bicuspid teeth resemble the molar teeth of the adult, and the three molars are absent.

Teething seldom causes sickness in a healthy child.

At about the age of six a whole new set begins to grow beneath the first set.

The root of the tooth is set into a socket in the jaw-bone, and a kind of soft bone called the cement fixes it into place.

With the best care some decayed cavities will develop and should be filled at once.

There is no reason why a set of teeth should not last a life-time, if brushed twice a day with water and picked with a toothpick after each meal.

The teeth are bony pegs set into the jaw-bones.

The teeth in the back part of the mouth are flat.

This book fails to give any description or even to mention the number of temporary teeth.

(2) *Steele's.*

The wisdom teeth do not appear until the twentieth to the twenty-fifth year.

The permanent teeth are fully developed in the jaw-bones beneath the temporary set, before they appear.

(3) *Stowell's.*

Two bicuspidis or small molars.

Around the root is a thin layer of bone called cement.

Teeth cannot repair themselves when injured.

(4) *Hutchinson's.*

The wisdom tooth does not appear until the twenty-fifth year.

The prevention of the tartar fungus is best prevented by the use of a weak solution of carbolic acid.

(5) *Blaisdell's.*

The food is broken into pieces in the mouth by the teeth, valuable little jewels of which the jaws are the jewel-cases.

When we are six years of age the milk teeth begin to decay and the second set gradually takes its place.

Each tooth is set into the jaw-bone like a post into a hole.

The roots of the teeth sink into the bony sockets much like a nail in a piece of wood.

Teeth are made of three things, dentin, enamel, and cement.

(6) *Walker's.*

Destruction of the enamel at any point exposes the entire cavity and decay results.

The first set or primary set.

The molar teeth pulverize the food.

The temporary teeth are shed as little conical crowns with convex bases.

(7) *May's.*

The teeth are arranged in two rows.

After the sixth year other teeth commence to grow to take the place of the milk teeth.

The teeth are similar on the two sides of the mouth, and are the same in the upper and lower jaws.

When cavities occur they should be filled with gold or silver foil.

Some of the other books examined contained the same mistakes found in the books just quoted from. Your committee, besides noting bad and flowery composition, noted the extreme vagueness throughout the entire list. A few of the special points observed which might be emphasized are as follows:

The word "antiseptic" is not used once.

The books generally advise the use of a soft brush.

The teeth may be filled with gold or silver foil.

They do not dwell on the function of the teeth as adjuncts to articulate speech, or on their esthetic value.

They fail to state that cleanliness of the gums is essential to a healthy mouth.

They do not dwell on the importance of retaining the temporary teeth.

They make no mention of the use of floss silk as one of the best adjuncts in the daily cleansing of the teeth.

It would be of no mean import to mention the kinds of filling materials.

The macroscopic description of the teeth is very vague; many of the books do not enumerate the roots found on the different teeth. Some do not mention the roots at all.

Not one makes mention of the apical foramen.

Only one makes mention of the tendency to inherit good or bad teeth.

Not one mentions the fact that the teeth vary in color according to the temperament of the person.

They do not dwell on the necessity of the frequent removal of the salivary deposits from the teeth.

They do not make any mention of the close relation of the teeth and their environments to the remainder of the digestive tract.

They do not mention the extreme importance of the sixth-year molar and the rather frequent mistaking of its identity for that of a temporary tooth.

In conclusion, your committee would like to say that if the literature in all the text-books examined were combined, the similar parts separated and the mistakes eliminated, we would have as a result, one good physiology.

The committee further suggests that the Dental Council of the State of Pennsylvania should be empowered by the Legislature to appoint some competent dentist or dentists to write the chapters pertaining to dentistry in the text-books, and furthermore to indorse the same.

E. W. BOHN, D.D.S., *Chairman,*

GEO. S. SCHLEGEL, D.D.S., *Sec'y,*

WILLIAM METER, D.D.S.,

H. L. CLEAVER, D.D.S.,

E. W. MENTZER, D.D.S.,

Committee.

S. E. TATE, D.D.S., *President.*

C. R. SCHOLL, *Sec'y.*

The PRESIDENT. You have heard the report of the Reading Dental Society; do you wish to take any action on it?

Dr. SCHAMBERG. Mr. President, I think it would be well to expedite matters by the appointment of a committee of five that would have power to act in both these matters. I therefore move that such a committee be appointed by the President, and that its members be instructed to communicate with the proper authorities so that they (the committee members) may become familiar with the supervising of such investigations in the State that might be necessary to carry on this work. Dentists throughout the State should be appointed by this committee to assist in collecting the desired statistics.

Motion seconded and carried.

The PRESIDENT. We will now proceed to the reading of papers.

The first paper is by Dr. W. J. ROE, of Philadelphia, on "Hypertrophy of the Gums," a continuation of one presented last year.

Dr. ROE, before reading his paper, said: The report of case No. 2 is quite brief, and I begin where I left off last year. If it is the wish of the society, I would be pleased to briefly go over the report I gave last year, so that the members of the society would probably understand this later report better, as it might be new, not having read the reports of the last meeting. (The essayist read from his report of last year, and then continued with his paper prepared for the present meeting.)*

*Printed in full in the DENTAL COSMOS for October, p. 1140.

Discussion.

Dr. SCHAMBERG, on being called upon to open the discussion, said: I had the pleasure of seeing the operation performed of which Dr. Roe speaks, and I also heard his paper at the last annual meeting of the State Society. I have not seen the patient since the operation, but, from what Dr. Roe has said, the success of the operation is assured. There were a few points brought out in his earlier paper which appeal very strongly to me, apropos of the probable cause of this disease, and I think that further investigation along this line would be of considerable interest.

I would suggest to Dr. Roe, if I may be permitted to do so, that he procure some monkeys from their native country for experimental inoculation before they contract tuberculosis, as most of the museum monkeys do; then by means of an aspirating needle draw some blood directly from the gum of a patient suffering from this condition and inject it immediately into the gum of the monkey. I believe successful results might accrue from this procedure, inasmuch as a fairly pure culture can be thus obtained if septic precautions are taken. The monkey being in so many respects similar to man, a like condition should be produced in the gum of the monkey by the *saccharomyces* if that fungus is the actual cause of the disease.

Dr. H. C. REGISTER. I had the pleasure of seeing this operation performed last fall by Dr. Roe.

I think hypertrophy of the gums is so seldom met with that we need give ourselves no trouble about it in our individual practice. It is the only case of true hypertrophy that has been called to my notice. We must not associate it with simple inflammation of the gums, which we frequently see; hypertrophy is quite a different disease. Just what causes it, I doubt if any one knows, but I cannot do otherwise than compliment Dr. Roe for the manner in which he performed the operation, taking the hypertrophied tissue from the jaws as you would strip a kid glove from the hand, and the teeth that remained would represent the fingers.

In other respects I was very much impressed,—especially with the care and antiseptic treatment of the hands, a requirement I think we can apply to ourselves in treating the mouth. He was extremely careful in regard to preparing not only his hands, but his nails. This part of the hands of many dentists is most unsanitary. It is diverging somewhat from the subject, but, as men who work in the mouth, I think we ought to give more attention to the antiseptic care of our hands than we do.

Another point that I gained from Dr. Roe's operation which bears directly upon our practice, and which has been of great service to me since I saw it, is that if the mucous membrane and fibrous tissue could be taken away from the bone as he stripped it off, we need not be afraid of taking it away to open up and help us in performing operations on the teeth extending below the gingivæ. I made up my mind that in all those cases that run up under the gingivæ, instead of putting on a clamp of some character to push the tissues back, which is always more or less painful, to amputate the mucous

and fibrous tissue if necessary to the alveoli. I have followed out this method with great satisfaction since I saw this operation, and in the treatment of such cases the amputated gum is perfectly reproduced. It has been a great help to me and to my patients, and I feel thankful to Dr. Roe for having suggested it to me through his masterly operation.

Dr. SCHAMBERG. There is another point that Dr. Register's remarks suggested to my mind that seems to be a most remarkable feature about the operation, and that is that the periosteum could be stripped off, together with the mucous membrane, from the alveolar process and the true bone without endangering its vitality. At the time of the operation I felt that the patient might subsequently suffer from some necrotic change of the bone tissue. I do not quite understand how the bone could thrive, or how the periosteum and mucous membrane could regenerate unless it be due to the ample blood supply found in the cancellated portions of the jawbones. We know, however, that the alveolus is especially prone to destructive conditions, and that frequently the stripping up of the periosteum through faulty local injections is followed by necrotic change. In this operation by Dr. Roe we have an example of bone being entirely stripped of its periosteum and still living on and becoming covered by healthy soft tissue.

Dr. ROE, in closing the discussion, said: I have nothing else to say, except to thank Dr. Register for his very kind and complimentary remarks.

In reference to Dr. Schamberg's suggestion to use monkeys for inoculation, I shall make use of this if the hypertrophy should recur, showing the presence of saccharomycetes. I was very much disappointed by the inoculations that were taken immediately after the tissue was removed at the time of operation failing to develop. The inoculation was made immediately, fearing a change might occur in the tissue when detached from the living body.

In reference to necrosis, the bone at no time showed any disposition to become necrosed. The periosteum was stripped from a very considerable area. To control the hemorrhage from the small vessels of the bone surface, and from the edge of the remaining periosteum subsequent to the operation, there were applied three agents, which I mention,—namely, hot water, solution of suprarenal extract, and Monsel's solution. These agents would contribute to the likelihood of necrosis by influencing the blood supply to the part, but neither the operation nor subsequent treatment caused the slightest appearance of necrosis.

The president announced the next paper to be one by Dr. GEORGE H. WILSON, of Cleveland, Ohio, the subject being "Porcelain."*

Before reading the paper, the essayist submitted to the members present, for their inspection, a cardboard to which were attached different specimens of porcelain.

*Printed in full in the DENTAL COSMOS for October, p. 1128.

Discussion.

The president called upon Dr. S. H. GUILFORD to open the discussion, which he did as follows :

I feel like complimenting Dr. Wilson on his paper, because it is more than a paper to be read before the State Society. It ought to and will go on record as a very fine epitome of the methods of manufacture of artificial teeth and the minerals composing them. With the exception of those who are engaged in the manufacture of teeth, I presume there are few who have gone into the subject to any considerable extent. He has stated very clearly the different constituents of artificial teeth,—quartz, feldspar, and kaolin or clay. Quartz is a mineral which is infusible. The kaolin is also infusible; that is to say, at any temperature to which we can subject it. Feldspar is the fusible ingredient. Quartz is for the purpose of giving the tooth body and strength, and at the same time its necessary whiteness. Kaolin is for a somewhat similar purpose. It gives body, is infusible, and at the same time it gives a certain opacity. Quartz is not opaque in an ordinary sense; it is more or less transparent, but it has such valuable properties that it constitutes the principal ingredient of the tooth. The kaolin is for the purpose of destroying transparency and giving opacity. Feldspar is for the purpose of uniting the other two ingredients. Quartz crystals are too expensive and too limited in quantity for general use, therefore quartz is taken as found in the ordinary mass, such as you see passed around for inspection this afternoon, and it is found in large quantities. Kaolin is decomposed feldspar, and is the result of chemical disintegration caused by air and water.

Another interesting thing in connection with the manufacture of porcelain teeth that is probably unknown to most of you is that porcelain teeth are made at a very low cost. The principal cost is the platinum pin. Artificial teeth cannot be made at a low cost except in a neighborhood where the materials which compose them are found. I know of none made outside of Philadelphia, or at any great distance from it. The company of which Dr. Crouse is the head started the manufacture of teeth in Chicago, but it was not long before it removed to Philadelphia. Why? Because within a distance of perhaps ten or fifteen miles these materials are found in great abundance. Along the Media road, within a short distance of the railroad, there is a most beautiful bed of kaolin; a little further along a mine of the same quartz that is shown here, and then just a little way across the road another mine of beautiful feldspar, so that in Delaware county, near Philadelphia, all these ingredients are found. As they are mined there in an inexpensive way and brought to Philadelphia, the teeth are made there, while they cannot be made to advantage anywhere else in this country. When the minerals reach their destination they are placed in bins; the quartz is hammered into small pieces, and whatever impurities there may be in it are picked out. The same with the feldspar. The kaolin is simply washed, filtered, dried, etc.

Dr. Wilson spoke of the quartz being reduced to an impalpable powder. I think that is not correct. A gentleman connected with

The S. S. White Dental Mfg. Co. told me some years ago that they did not powder the quartz very fine. The feldspar they did. The object in not powdering the quartz was to give the teeth a certain appearance. An American tooth is different from an English tooth. When you look at it with a magnifying glass it looks porous. In reality it is not porous, but these comparatively coarse grains of quartz are what give it that peculiar appearance. In making the English teeth the quartz is pulverized more finely, and the ingredients are poured into a mold. The English tooth is what we call a "fine grained" tooth. It has a very smooth, even appearance. Many like that appearance, but the American tooth, with the mottled appearance,—that is what gives the tooth its characteristic feature,—is the tooth that is most generally preferred. The English teeth when ground and polished present the same kind of surface on the inside as on the outside. That is due to the ingredients having been ground so very fine, and also to the fact that the English tooth is not enameled. All the material that goes to make it up is mixed together and passes into the mold. The American tooth has a layer of enamel on the outside, the enamel being painted on the surface of the mold; the tooth-body is then placed in, and the molds are clamped and subjected to tremendous hydraulic pressure.

The essayist spoke of Dr. Wildman. I knew him. He was one of my professors when I was at college; a man who did a great deal for dentistry in general. I did not know that he had perfected the art of porcelain making so far as the teeth are concerned. What he is chiefly noted for is the fact that he discovered the way of giving the peculiar color to the artificial gum. The discovery of a coloring matter that could be put to use and would be desirable was his discovery. It did not make his fortune, but it made the fortune of other manufacturers. And Dr. Wildman is principally known, aside from his ordinary investigations, from the fact that he made that discovery of the coloring of the gums.

Porcelain as we use it to-day, as Dr. Wilson has said, is getting to be more and more a substance with which the dentist will have to deal in the future. The display of gold, even in fillings, is disagreeable to the educated human being, at least in this country, and porcelain has come to take its place. Not only that, but it has grown to be a subject more and more taught in the schools,—not making porcelain teeth in the ordinary way, but constructing a porcelain crown from ordinary plate teeth and in the making of porcelain inlays, as is now being done by practitioners throughout the country.

There are many difficulties yet to be overcome in the making and insertion of porcelain fillings.

The essayist said that we have three grades of porcelain; low, medium, and high-fusing, and the conclusion he arrived at was that medium-fusing was preferable to the high or low, as the high or low under certain circumstances is objectionable. It seems to me that the higher grade of porcelain, the high-fusing, is the best for our purpose. If the low-fusing porcelain is used, the enamel must

never be touched with the grindstone or disk afterward. It is the aim of every one who makes porcelain inlays to make them so perfect that neither the outside surface nor the edges should be touched, but if the porcelain has to be ground after it is made the high-fusing can be thus treated without looking badly.

The PRESIDENT. The other gentlemen who were to discuss the paper are not here at present, and it is now open for general discussion to any one who wishes to speak on it.

Dr. HERTZ. There was one point made by the essayist I did not fully understand: whether he said the high or the low-fusing porcelain was more porous than the medium.

Dr. WILSON. The high-fusing has a tendency to be porous, and the low-fusing porcelain will become porous.

Dr. HERTZ. The general impression is that the higher the fusing the less porous it is. Have you had any experience with the Whiteley bodies?

Dr. WILSON. No. I have had with the Consolidated, a formula made by the same man.

Dr. BROOMELL. If I may be pardoned for referring to the practical side of the question, I would like to speak of a new field—at least a field new to me—for porcelain inlays. I think if this work is used as an intermediary between artificial crowns and gold fillings, it has a decidedly wide and useful field. By that I mean those cavities which we meet every day, cavities that can be filled in no other way than by what we usually term a “temporary” filling. In many cases I have met with success in applying porcelain to approximal cavities in the bicuspid, just such locations and under such conditions where heretofore I would have placed a temporary filling or a plastic filling of some kind. This is not done with the idea of permanence. It would not, of course, be serviceable in large cavities, more or less exposed, where we have a frail free margin, and particularly where the cervical margin is not readily approached; but they will stand five, eight, or ten years,—possibly very much longer than cement would stand in the same location. I have put them in in these locations, giving the patient to understand that they are better than a cement filling. But they are not, possibly, as good as a crown would eventually be, but still it defers the work of removing the crown and placing a porcelain crown. The work can be done not only on the bicuspid, but on the molar teeth as well. The idea is not one of beautifying the mouth particularly, although it does to a certain extent, because we get rid of a great mass of amalgam, or possibly discolored cement.

Just one other word in regard to the working of porcelain, which I think has not been mentioned, although it may be generally understood, and that is the matter of cooling off the porcelain. It seems to me that this is a subject of great importance, and one that is always to be considered. I know if the inlay is made hurriedly and the furnace cooled off quickly the result is a body quite fragile, with margins which break down quite readily; but if the furnace is

allowed to cool off completely you have a much better result than if the work is hurried.

Dr. ROBERT HUEY. I have had little experience in porcelain fillings, but have made a number of experiments in that line with only mediocre success, one difficulty being inability always to get the exact shade. In labial cavities porcelain unquestionably looks better than gold, but I doubt if it can be made as permanent; and some careful operators have already expressed the same opinion.

The most satisfactory use I can make of porcelain is in mounting crowns. After preparing the root and accurately adjusting a collar, making a lap joint and soldering with pure gold twenty-two parts and platinum two parts, I carefully grind the neck of the porcelain crown to fit into the collar and fuse both together with a low-fusing enamel. This makes a strong, clean, and quickly made substitute for the natural crown.

Dr. C. V. KRATZER. I think the remarks of Dr. Broomell are valuable with reference to the preservation of the teeth that would otherwise require cement fillings or be replaced with artificial crowns. If porcelain fillings can be inserted in very weak teeth, so that they may be preserved for five or more years, at the end of which time a porcelain or other crown may become necessary, I think it is a great advantage, and a great service has been performed for our patients, because the permanence of the crown will extend the period of usefulness that much further than if the crown were used in the first place,—assuming, of course, that the crown is not always permanent during the life of the patient.

The objection in my mind to the use of porcelain for inlay work—that is, to its universal or extended use—is that, in the case of approximal cavities, so much space is required for manipulation in taking an impression of the cavity and inserting the inlay that in many cases there would be what would seem to me a useless sacrifice of tooth-substance. When the cavity is small and the tooth can be preserved by a filling of gold, I think it is better, where the filling is not too conspicuous, to use gold in such cases rather than to enlarge the cavity so as to be enabled to take an impression for porcelain work, unless the case is one in which space can be obtained without too much separation. Where the cavity is large and access is easily obtained, porcelain fillings in the anterior teeth would certainly seem preferable to gold.

Dr. J. P. NICHOL. I agree with Dr. Wilson when I say that a high-fusing or very finely ground high-fusing porcelain would be about the best to work. And in regard to cooling off, I think the remark made by Dr. Broomell was a good one. He said it is always better to let the furnace cool down and you have better results; let it cool down entirely, so that you can take the piece out with your hands.

Dr. F. L. HOLLISTER. I would like to ask a question or two, and that is in regard to fastening inlays to the tooth,—small pieces on the approximal surfaces, corners, and such places. And another is, I would like to know how they manage to color them perfectly to

make them match. That is my worst trouble,—to get a proper color, and then to fasten them.

My work has all been practical, and not in the nature of scientific work at all. I have a good deal of difficulty, and the work is not always satisfactory, and I would like to hear from some one who could give me some ideas on these points. That is my great trouble,—fastening them and coloring. I wish Dr. Wilson or some one would give me some ideas on that point.

Dr. GUILFORD. I did not say much about the practical part, because I felt that many or every one knew as much about it as I did. In regard to different bodies, I have tried a variety of them, and I have come to the conclusion that the Whiteley body is more satisfactory than any other I have used. I tried those of Close, Moffitt, Ash, and others, and have settled down to the use of Whiteley's altogether.

In regard to coloring, in the Whiteley set we have a great variety or number of bottles, and we have samples corresponding to them. When we want to make an inlay, we take a sample and lay it beside the shade required. I believe it is impossible for a man to take up porcelain work and do it occasionally and do it well. As a rule, men who do certain work well are those who do it all the time. Much experience is necessary to obtain success. I would not have time to take up porcelain inlay work and carry it forward as it should be, but by having an assistant who will do that work for me, and who becomes skillful, I am enabled to do it. When I start to make an inlay, I prepare the cavity in the ordinary way, so that the impression can be readily withdrawn. Then I take three impressions, because it takes but a few seconds. I chill them with ice-water, and from them I make my matrices; my assistant then makes three separate inlays. I have him put a certain amount of body which he thinks is the right color in one. In another he puts a trifle lighter shade, and in another a little darker, so that I have three separate shades to select from. Usually the first one made proves satisfactory, because by doing it all the time he succeeds very well.

In handling it I take an ordinary piece of orange-wood much smaller than a lead pencil, and with a little hard wax I stick the inlay on to the end. With that I can try it in the cavity and take it out. When I am ready, I have it lying on the table, and I mark with a lead pencil a certain point—for instance, the back or front—to correspond so that I won't make a mistake in picking it up quickly. I mix the cement, and put a little in the cavity and a little on the inlay. Sometimes there has to be a little grinding on the edge, where there is a feather-edge of the porcelain. But by doing it in this way I have three different inlays to select from; they are easily made, but in order to do it skillfully a man ought to do it a great deal.

I think there is a large future for porcelain work, and that it is being used to-day also where it ought not to be used. I think that in an average case a good gold filling is better than a porcelain inlay, but where it is desirable to avoid the appearance of gold and

there would be a large gold filling that would be a tax on the patient's nervous system I believe it would be better to put in porcelain.

Dr. WILSON, in closing the discussion, said: I thank you very much for the kindly consideration you have given the paper. In regard to some of the matters I may be mistaken. I took it from the "American Text-Book of Prosthetic Dentistry," and, if that is correct, I think the doctor is mistaken in saying that the quartz should not be ground so fine. As to Dr. Wildman, what I know of him is only from reading.

When I say a "medium-fusing," I mean what we consider high-fusing, but it is medium-fusing compared with other elementary substances. I made the statement that the highest-fusing dense body was undoubtedly the suitable material for use.

Some of you may have come in contact with Dr. A. E. Beck, of Minneapolis, at New York a year or so ago. He uses a Consolidated tooth, and so gets a very high-fusing material. I think it is very good.

If the edges of the cavity be dusted with soapstone, and soapstone be mixed in the cement, then when the material is placed in the cavity it will become exceedingly hard; and, being so loaded with soapstone, it comes out readily, so that he has a hard, dense impression that he can invest and swage with platinum over that. He will then have inside of his impression the exact shape and form and size of the cavity, so that he will make the inlay to fit the cavity exactly, not an exact fit less the thickness of the platinum.

It is not necessary to have any more space between the teeth than you would have for a tooth-filling; that is, the walls are cut through from the labial to the lingual side, so that they are straight through. Instead of having the cavity so as to have thin edges, he would cut those back so as to be practically parallel, so that the ends of the cavity are as thick as in the center of the cavity. I think it is a very good point in that respect.

(To be continued.)

ANNUAL CONVENTION OF THE SIXTH, SEVENTH, AND EIGHTH DISTRICT DENTAL SOCIETIES OF THE STATE OF NEW YORK.

THE thirty-third annual convention of the Sixth, Seventh, and Eighth District Dental Societies of the State of New York was held in the assembly hall of the Osburn House, Rochester, October 29, 30, and 31, 1901.

FIRST DAY—*Morning Session.*

The convention was called to order at 10.30 A.M.; Dr. W. W. Belcher, president of the Seventh District Society, in the chair.

The minutes of the last annual convention were read and approved, after which the following paper was read by W. A. PURRINGTON, Esq.:

THE THEORY AND ENFORCEMENT OF DENTAL LEGISLATION.

In order to achieve results one must keep in view his end, and realize the means best adapted to obtain it. Enthusiasm is a great factor in success, but judgment is as essential. Those of you who—for your sins and physical betterment—play the royal game of golf know how true this is even in sport. To the novice, nothing seems easier than to hit the little white ball perched well above the ground on a comfortable tee and drive it far into the distance. And yet before the simple problem of sending that wretched ball in a straight direction toward the green, what downfalls has pride! One puts forth mighty but ill-directed effort, and tops, pulls, slices, and fozzles in every form. The pestilent little ball sits mockingly on the tee or rolls a few pitiful yards to one side, while the enthusiast utters exclamatory speech in amazement and vexation.

We are talking in the family, as it were, and I purpose speaking with domestic frankness.

The only thing that seems to some easier than hitting a teed-up golf ball is convicting a violator of laws that restrict the pursuit of business,—whether that business be the practice of medicine or its department, dentistry, the sale of liquor, the importation of dutiable goods, the management of a railroad, or any other occupation whereby man seeks gain. At first blush how easy it appears to prove the unlicensed treatment of disease, the unlawful sale of spirits, the smuggling of goods, the rebate of tariffs; but how rare are convictions of these offenses, especially in communities that seriously incline to their convictions! Even in sparsely settled localities, where prohibitionists dominate public sentiment, the thirsty soul may find unlawful comfort. And of late the attempted strict enforcement of the Sunday law in the metropolis did not close side doors, but did relegate to the background the reform element that a popular uprising against gross civic corruption had swept into power.

Enthusiasm, therefore, and I am far from belittling its enormous value in all good work, unless joined with judgment and deliberation, unless defining clearly its ends and well considering the adaptability of means thereto, falls by the wayside or sacrifices long results to immediate triumphs. The wise golfer, intent on winning his game, does not seek his utmost distance when he knows that his long drive will drop the ball into a sand-pit. He plays up to the hazard, and carries it on the second stroke. So, too, in enforcing statutes we must have an eye to the hazard. It is ancient wisdom that the best way to repeal a bad law is to enforce it rigorously, but it is equally true that injudicious enforcement of laws that are in the main good may bring about their repeal also. Thus the efforts of the physicians of England to prevent all apothecaries from prescribing, although sustained in the law courts, was defeated in the House of Lords; because it seemed unreasonable to the peers

that it should be necessary to call to the sick, surgeons to let blood, physicians to prescribe remedies, and apothecaries to dispense the prescription. And this defeat, while leaving the letter of the law on the statute-books, opened the general practice of medicine to all comers. So, too, in our own state the vehemence with which regular physicians sought to apply the medical license law to the extirpation of the homeopathic schism brought about, in 1848, a general repeal of those provisions of the statute that seemed to work to that end. I well remember hearing a former brilliant United States district attorney of the Southern District of New York, who achieved national reputation, say that in his judgment a strictly logical district attorney acting upon the theory that every law should be strictly enforced in all cases would be one of the most dangerous men in a community.

But some will say, Are laws to be enforced with fear and favor? Not at all, I answer, but with judgment and clemency; with that seasoning of mercy that makes human justice seem likest God's, and that by persuading the spectator that the prosecution is aiming at the suppression of public evils and not the oppression of individuals wins over the sentiment of the community to the side of the law.

Upon what theory, then, are laws regulating the practice of dentistry enacted? In other words, what end have they in view?

These laws are passed under the so-called police power of the state,—that elastic and vaguely determined principle whereunder legislatures provide for the general welfare, prohibiting acts and practices offensive to good morals, subversive of the peace and comfort, and dangerous to the health of the individuals who make up the community at large. In every instance wherein courts have declared medical legislation constitutional, and in this regard dentistry is treated as a branch of medicine, the decision has been rested expressly upon the ground that the practice of medicine, in any of its departments, requires knowledge and skill, and since it concerns intimately the public health should not, for that reason, be permitted to the ignorant, the untrained, and unskillful. Thus, to cite only one, and that the highest, authority, the Supreme Court of the United States, in the case of *Dent vs. West Virginia*, affirming the conviction of an unlicensed medical practitioner, said: "The power of the state to provide for the general welfare of its people authorizes it to prescribe all such regulations as in its judgment will secure or tend to secure them against the consequences of ignorance and incapacity, as well as of deception and fraud. As one means to this end it has been the practice of different states, from time immemorial, to exact in many pursuits a certain degree of skill and learning upon which the community may confidently rely; their possession being generally ascertained upon an examination of parties by competent persons, or inferred from a certificate to them in the form of a diploma or license from an institution established for instruction on the subjects, scientific and otherwise, with which such pursuits have to deal." And the learned justice goes on to say, "Few professions require more careful preparation

by one who seeks to enter it than that of medicine," and to elaborate upon that theme. Here, then, we have the aim and theory of dental legislation, which is intended not as a measure of trades-unionism, —although there are reported cases holding dentistry to be a trade or handicraft,—not as a system of protection for individual practitioners and the establishment of a guild, but as a shield for the public against incompetence in a profession intimately related to the public health. That is the aim of this legislation, and in that spirit only should it be enforced. The moment prosecutions under this law are suspected of being conducted for private and not public interests,—to punish rivals, to gratify personal grudges, to limit the number of competent practitioners arbitrarily, so that the "ins" may profit at the expense of the "outs,"—that moment the theory of the law fails, public opinion sets against it, and its enforcement becomes impracticable, as experience has abundantly shown.

Under our statute, the State Dental Society and its component societies are specifically authorized to aid in enforcing the law, and to them are given, in order to defray their expenses in so doing, the fines and forfeitures collected from their prosecutions. This is done for obvious reasons. While the aim of the law is, as we have said, to protect the public, at the same time the exclusion from the ranks of practitioners of ignorant and untrained men redounds to the honor and interest of the profession at large, which has therefore a direct concern in the proper enforcement of the law. Statutes giving moiety to individual informers have always been abused, and for that reason the fines are given under our statute to societies, creations of the state, under respectable control. But these societies have no exclusive right to set the law in operation by lodging informations of its violation, nor are they compelled to set it in operation wherever its enforcement on strictly technical lines would defeat its purpose. In short, the societies have no greater right to set the law in operation than has any citizen who may know of its violation, nor are they any more compellable to lodge informations than any other citizen would be. And in theory neither the societies nor private citizens are under the same obligation to report breaches of the law as are district attorneys and grand juries, who are sworn pursuers of crime.

I began by alluding to the seemingly easy, but actually difficult and exasperating, game of golf. Nothing is harder to learn in that tantalizing sport than that good results are often almost inversely as the amount of brute force expended and directly proportional to the precision, calmness, and, so to speak, tact with which a stroke is made. One must be sure of his direction, keep his eye on the ball, and adjust his force to circumstances. So, to my mind, that which is never for a moment to be lost sight of in enforcing the dental law is the fact that its chief value is in educating the public to appreciate what dentistry really is. It is a truism to say that no law can for long be enforced which is very far ahead or very far behind the public sentiment of the locality wherein it operates, or, if it deal with the regulation of business, the opinion of enlightened practitioners of that business. The public must perceive that in

the main it subserves the general welfare. Those who follow the profession, trade, or calling affected must be satisfied that the statute makes for the honor of their class, and does not unduly hamper business. If the preponderating opinion either of the laity or of those whose business is concerned is that the statute is unduly harsh or inadequate, it must fail of good results. History is full of such teachings. In the early part of the nineteenth century men were hung in England for petty larceny and such trivial offenses as poaching, yet crime was fully as prevalent as it now is, and the greater crimes probably more so. Humane men condoned trifling thefts because of their too drastic punishment; juries rendered such verdicts as guilty of stealing a guinea worth sixpence. On the other hand, so little did the death penalty deter from crime that pockets were picked in the crowd surrounding the gallows wherefrom the pickpocket swung into eternity and made a holiday for the spectators. Where it was as great a crime to poach as to murder, the poacher murdered the gamekeeper, knowing that he enhanced his chance of escape but did not enhance the penalty of his crime; and thus the law stimulated rather than repressed the graver offenses.

In educating the public we have to make haste slowly, and ever bear in mind the Horatian wisdom, *Sit modus in rebus*,—let there be moderation in all things. What the dental profession desires, apart from the public protection, is to secure not only educated, skilled, and trained, but respectable and honorable men in its ranks. In order to do this the public has to be taught that only such men are fitted to practice dentistry. It is idle to shut one's eyes to the fact that a contrary opinion has existed, the effects of which still linger. Nor are we to forget that, although in theory the principles of our law are accepted, whenever it comes to the enforcement of the statute public sympathy is apt to be (and often most unreasonably) with the individual prosecuted. The most depraved murderer is as likely as not to receive flowers from the most innocent girls, and, if this can be in gross offenses, it is not much to be wondered at if an unreasoning but sympathetic jury are loth to deprive a man of the means of livelihood in the absence of proof that he is not only violating the law, but is also a bungler at what the jurors may consider a mere mechanical business.

And so we are not to be unduly discouraged because the law does not always seem to achieve its results. I dislike vain boasting, and in the years during which I have been counsel of your state society I have scrupulously refrained from pretending that my part in the administration of the law has freed the community of quacks and incompetents, who, like the poor, are, and always will be, with us. So long as we are unable by law to extirpate the intrinsically evil crimes of murder, arson, larceny, and the like,—when the head of the nation is not safe in an assemblage of his countrymen from the assassin's bullet,—we certainly need not despair or consider our lesser law inadequate because we have not utterly abolished minor offenses which are criminal only because made so by statute. And he is a very foolish and unscientific per-

son who argues that a law is ineffective that does not catch in its net all who violate its precepts. The Ten Commandments are broken every day, but no one denies that they are pretty good laws.

We test a statute by its long results. When it was first my duty to have to do with the medical law of this state, what was required of one seeking license to practice as a physician? A diploma from a chartered college or medical society,—nothing more. The best colleges conferred their diplomas after a brief course of lectures lasting two years, or even less. Medical students were often destitute of the preliminary education qualifying them to apprehend and assimilate the teachings of their text-books. Tender-hearted faculties plucked fools with undisguised reluctance, apparently entertaining an unconfessed but latent conviction that payment of fees established a quasi-contractual right on the part of matriculants to diplomas. And how unspeakable were the worst colleges, so called, the wretched “diploma-mills,” organized solely for the sake of gain, and absolutely selling licenses to kill! I am profoundly convinced that not a little of the success of such fantastic madneses as Eddyism, Dowieism, Schlachterism, and all other such crazes is due to the fact that their alleged cures are often sequent to the diagnosis of some utterly ignorant man foisted with a pseudo-title in medicine upon a credulous public by these wretched corporations. And yet so blinding is self-interest that many even of the reputable men foresaw in the abolition of the diploma standard of license and the increase in length of term of educational standards the loss of college emolument, if not of existence. It is to the lasting credit of the medical profession that it brought about the better condition of medical education. It is particularly to the credit of our betters, the women, that in this state, if I am rightly informed, the lead was taken in requiring a three years’ course of medical study by the Woman’s College of the New York Infirmary; and I can personally well remember when the Harvard Medical School, to its great honor, extended its course, with the immediate result of almost emptying its halls, but with the long result of placing the university in the van of medical teaching. What these colleges did voluntarily others were compelled to do by the pressure of the statute, and I doubt if any respectable college of the state to-day would willingly revert to the old condition of affairs, when its diploma was belittled by being placed upon equality in the law with the parchments sold by corporations of the Buchanan stripe. To-day, in this state at least, the diploma is not a license, and yet the colleges have found that the adoption of a higher standard has been followed by larger attendance than ever; and although he would be mad indeed who should pretend that incompetents do not still slip into the profession through the meshes of college and state examinations, yet it will scarcely be denied that, synchronously with the enactment of our medical laws, and as I believe largely though by no means entirely on account of them, the sick to-day are attended by practitioners of medicine far better educated and equipped on the average than were their fathers. The same is true to a large extent in your special department of

medical work. It is not so long ago that the dentist was in the public eye on a plane with the midwife and truss-maker. "Tooth-carpenter" was the term of opprobrium for him, as "sawbones" was once for the general surgeon, who, as you know, was not formerly in England of the same social standing as the physician; and to this day in that tidy island is styled "Mr.," not "Dr.," because, inasmuch as his specialty required large manual skill not necessary to the physician, he was regarded to some extent rather as a mechanic than as a member of a learned profession. To such an extent are we affected in our modern life by outgrown traditions.

To-day as much medical study is required of candidates for the degree and license in dentistry, in this state at least, as was formerly demanded of medical licentiates, and more preliminary study; and the logical outcome of the existing tendency is to place the dentist, or, if you please so to call him, the odontologist or stomatologist, on the same plane with the orthopedist, the gynecologist, rhinologist, otologist, or any other person who, having qualified himself for the general practice of medicine and received his doctor's degree, elects to specialize himself as an "-ologist" of some sort. Why a dentist should wish to keep aloof from the body of the medical profession and be classified in public opinion with pedicures, midwives, masseurs, truss-makers, and others who hang onto the hem of the faculties' robes, I, a layman, cannot see. But what I can see is that the separation of dentists from other medical specialists is a stumblingblock in the administration of medical and dental law.

What, then, are the difficulties in the way of enforcing a statute of such beneficent intent?

First of all, we have the difficulty of proof that the law has been violated. There are many things that we cannot prove of which we are morally sure, and oftentimes the simpler they are the harder it is to find proof of them. When they are so simple that argument cannot make them simpler, we call them axiomatic. When we have said that a straight line is the shortest distance between two points, we have no method of making that proposition plainer; and yet I have known a man to doubt it when, for the first time, he saw an object roll down the arc of a cycloid as fast as another descended its chord. On the other hand, nothing seems more manifest to our senses than that the sun goes around our motionless earth, yet the wise men tell us that it is the earth that revolves about the sun; and they who laugh most at those who advance the old theory are the persons least capable of demonstrating the reason for the faith that is in them.

You hear that Jones, whom you know to be unlicensed, is practicing dentistry. You are sure of it; he has an office, you see him in it; perhaps you see him at a chair in which is a patient; possibly you receive a letter from the cowardly creature who writes anonymously when he dares not strike openly. And yet, morally convinced as you are, you may have no legal proof of the fact; the accused has a right to have an office and to employ dentists in it and to frequent it, so long as he does not personally practice. He

may stand by the chair and speak with the patient; more than that, if he is a student of a registered practitioner in his employ he has a right to assist the preceptor in the performance of operations. Indeed, it often happens in emergencies that a layman may be summoned to assist a surgeon in great operations, and to prosecute him would be a perversion of the law from its true intent. You cannot prosecute upon inferences alone. How, then, are you to proceed? Obviously in one of two ways, or by a combination of both:

First. You may send detectives to the suspected office with instructions to secure evidence by submitting to an operation.

Second. You may ascertain the names of actual patients of the accused and summon them to court by subpoena.

Third. You may use the evidence of the detective, and corroborate him by patients.

Let us see how these methods work in practice. A detective, if he be what the French call an *agent provocateur*, is about as poor a soul as moves. Not only is he a spy,—and from the time when Joseph's brethren said, "We are true men, thy servants are not spies," the spy has not been regarded as a particularly true man,—but when he incites and persuades to the commission of crime, in order to punish the victim of his zeal and "make a case," he becomes entirely discredited. For example, every one has contempt for the man who, for the sake of enforcing the excise law, pretends to be suffering pain and persuades another to sell him out of sympathy what he might have refused to sell at the mere request. In such a case I think that any one of us in the jury-box would exercise his privilege of disbelieving the witness, and would be sorely tempted to go further and give the accused the benefit not only of a reasonable, but of an unreasonable doubt.

But even when the agent does not provoke the offense by persuasion or falsehood, and does no more than visit the suspected office and submit, like any other patient, to an operation, there is apt to be prejudice in small communities against accepting his testimony. In large cities it is more possible to convict upon the uncorroborated testimony of these men, because the juries are indifferent as to the accused and the accuser. Yet even in the metropolis it has been the policy of the State Society to seek convictions as rarely as possible upon the testimony of its agents alone, however much assured of their truthfulness. The temptation to a detective to make out his case by stretching the truth is so strong, and it is so natural for a jury to suspect that this has been done, that it has seemed wise to minimize this suspicion.

How is it with the actual patients? They are generally unwilling witnesses, often friendly to the accused, especially if they believe him to be, although unlicensed, competent to perform the work he undertakes. Even when, as often happens, they are indignant to think that they have been in the hands of an unlicensed and incompetent person, and willing to make complaint, still their enthusiasm dies out under the annoyance and loss of time incident to the delays which the defense constantly seeks in order to tire out the prosecution. They may be also unwilling to appear in the

rôle of "informers," and if friendly and unscrupulous they forget dates, fail to identify the accused, and resort to other evasions of a nature to defeat prosecution,—the commonest of which is to pretend that the accused was not acting independently, but under a preceptor's instructions.

The surest case is made out when practice is established by proving the holding out by a sign or advertisement the operation upon the detective, and the operations also upon patients whose very reluctance to testify establishes their good faith.

But even when the case is made clear to demonstration there are still difficulties in the way of prosecution. Juries, grand or petit, and even magistrates, at times substitute their ideas of "rough justice" for their sworn duty under the law.

The usual course of procedure is to inform a committing magistrate of the breach of law, supporting the information by affidavits showing the facts in which that breach consists, the commonest being the facts of practice and non-registration. These affidavits have to be made upon the direct knowledge of the affiant as to the circumstances therein set forth. Upon these statements, a warrant is issued returnable before the magistrate, who, outside of New York city, may have power to try the case, whereas in New York he only holds the accused for trial. The defendant may elect to be tried before such a magistrate without a jury or before a jury of six men, or he may apply to the higher court to transfer his case, in which event the evidence against him has to be sifted by a grand jury, practically an absolutely irresponsible body that carries into the jury-room a knowledge of persons and facts that too often leads the jurors to disregard evidence that is as satisfactory as geometrical proof. If a grand jury throw out the case it may be resubmitted to another. But when the petit jury acquits, even though that acquittal be manifestly a disregard of the evidence, that is an end of the action; it is only on judgments of conviction that the appeal will lie.

Of course, where juries refuse to find according to the clear evidence there are only two explanations of their action: they are either too stupid to understand evidence, or, what is more likely, they substitute their sympathies and prejudices—either as to the persons involved or the law itself—for the conclusion of their minds. Two or three examples will suffice to illustrate how the law may miscarry in the face of such prejudices.

Perhaps the most notorious case was that of Barnes, of Herkimer. This man was never graduated from a dental college. He came to New York city some years ago after a career in Massachusetts which I will not consume your time in reciting. He represented himself as a registered practitioner, and secured employment with a man who having married the widow of a dentist conducting an advertising office in Grand street had so succeeded to that business. Barnes so preyed upon the fears of his employer that the latter, though well past middle life, took up the study of dentistry and qualified under the law. Barnes then took himself to Herkimer and opened an office. He was called as an expert in an amusing assault

case, wherein the issue was whether a tooth had been pushed in or pulled out. In order to qualify as an expert he falsely swore that he had been graduated from the Boston Dental College, and then he undertook to pass upon the question whether it could be said from the appearance of the alveolar process which theory of the case was correct. His practice was notorious, and he was not registered. These facts were thrice placed before the grand juries, the last one of which was charged by Mr. Justice Kennedy, of the Supreme Court, in strenuous terms that it had nothing to do with the constitutionality of the law, and that it had no right to resolve itself into a petit jury, but that its sole office was to pass upon the evidence for the prosecution, and if it found therefrom that the law had been violated to bring in a true bill. Not only did none of these bodies find an indictment, although the votes in favor of the bill increased with each jury, but the local press took up the matter and said editorially and in specific terms that although Barnes was undoubtedly violating the law, it would not be possible to have him indicted in that county. Now, what was the reason for this gross disregard of sworn duty by these jurors and this shameless approval of their course by the press? Simply this,—Barnes was personally a popular man. The prosecution against him originated upon the information of a local dentist who had been the expert on the other side in the assault case to which I have referred; the informant was unpopular, and the juries and newspapers took sides. What, after all, is a little thing like the constitution between friends?

An even more absurd case arose in Warsaw. Two graduates of dental colleges went there to practice. There was another practitioner in business who was indigenous to the region. I am told that he was, if not a good dentist, at all events a fair wheelwright. The college men reported him to the district attorney, who placed the case before the grand jury. That impartial body sent for the county clerk's records, and, finding that neither the accusers nor the accused were registered, indicted the former and refused to indict the latter.

In Troy last year a man openly practicing there was taken before a magistrate, who held him for trial. His case went before the grand jury, to whom it was shown not only that he had practiced dentistry without registration, but that he had sworn falsely and contradictorily as to his qualifications in proceedings before the Supreme Court, and that his original registration, which was in fact no registration in law, had been altered after it had been sworn to. Yet the local grand jury refused to indict.

It is needless to illustrate further. In almost every instance your prosecutions have been successful. The notable failures have occurred where local prejudice has diverted the minds of the jurors from their sworn duty.

The lessons of all this are obvious and simple. Cases should be prosecuted in the first instance wherein the facts are so clear and so well established that honest men upon juries will be compelled to convict. The efforts of the accused to arouse local sympathy by

raising the false cry of persecution must be met by demonstrating the falsity of their statements. While I am the very last person to countenance the trial of cases in the newspapers rather than in the courts, I am frank to say that, in view of the experiences in Herkimer and Troy, and of the fact that our newspapers in their love of sensation unfortunately publish statements furnished by irresponsible persons and with no investigation of their truth, it becomes a necessity to see that the defense shall not create false public impression in behalf of the accused.

Discussion.

Dr. S. A. FREEMAN, Buffalo, said he was glad that this paper had been read before the convention, as it would be an enduring exposition of dental law presented by a gentleman who has made the subject a study for a great many years, a gentleman whose services we have been fortunate in securing to assist the dentists of the state of New York in procuring, interpreting, and enforcing our dental legislation.

Not being a lawyer himself, he would not take up the matter of dental legislation at large, but would confine himself to the discussion of a few facts pertaining to it. Laws regulating the practice of dentistry are necessary; they have been found so in every advanced nation. The time to discuss that proposition has passed. Experience has lifted it from the realm of uncertainty. Dental laws have improved the practice of dentistry, and have given it a professional standing. The enforcement of these laws is difficult and uncertain, but their moral effect is of great value to us as practitioners, and its elevating force is invaluable. The law of the state of New York is probably the best; it is certainly as good as that of any other state in the Union, but to preserve it against the assaults of its enemies requires eternal vigilance on the part of its friends. The legislation upon such subjects as affect, or seem to affect, only the members of a single profession is very uncertain. After a law is passed and put upon the statute books some Tom, Dick, or Harry will feel that it is to his interest to have it amended or perhaps abolished. He will go before the legislature and bring to bear every influence he is able to wield; will place in jeopardy all that which cost the professional men of the state so much trouble to perfect, and cause the necessity of a permanent committee on legislation, who will need to be eternally vigilant and active in defense or the work will be undone. If the legislature met only once in four years, and then only for sixty days, we would be much more comfortable.

The courts rule that we are a branch of the medical profession, but a large majority of dentists take the opposite view. Raising the standard of education, especially the recent action of the Association of Dental Faculties which increased the time required to go through a dental school to four years, is bringing the two professions nearer together, and the time may not be far off when dentistry and medicine will coalesce; but there are many influences which will tend to maintain the professions separate. This paper of

Mr. Purrington should be read and studied by dentists everywhere. It is full of matter that deserves wider acceptance than that of any convention,—that of the profession at large.

Dr. M. D. JEWELL, of Richfield. I venture the assertion that, aside from those topics directly along the lines of our special vocation, no subject has been presented before a body of dentists in the state of New York more timely and of more vital interest than the paper now under discussion. To me it has come as a revelation. In attempting to discuss the subject I find myself in the anomalous position of being obliged to agree with the essayist in every point taken. For twenty-two years we have struggled with the problem of dental legislation. Repeal has followed enactment and enactment repeal until the mind of the average practitioner of dentistry is in a state of chaotic bewilderment in the fruitless endeavor to ascertain "where we are at."

What is law? In the general acceptation of the term, "law," says Kent, "defines the rights and prescribes the duties of nations (or individuals) in their intercourse with each other." Again, according to Samuel Johnson's definition, "Law is the best result of human wisdom acting upon human experience for the *benefit of the public*." Law, therefore, is not only expedient, but it is essential. Those dental laws already in force are wholesome and just; it is only the enforcement of them that troubles us.

Let us review the situation. In 1868 the preliminary law of organization went into effect. Ten years later it was followed by a restrictive enactment which, though promulgated in the most charitable spirit and with the ultimate good of the community only in view, was, is, and ever will be considered by the masses in the nature of an abridgment of those privileges which are the constitutional right of the individual. And so, while endeavoring to foist upon the public something they were not prepared for, or at least were not inclined to receive, like turkey-cocks we expanded our plumage and strutted about the country in a premature endeavor to make the common people think that we are really the "tip-top blue-blossom fraternity" that the revered and late lamented Professor Atkinson used to tell us about, only to have the humiliating experience, at this late day, of having a gentleman of another profession come among us and point out to our wondering gaze the utter futility of our effort. Futile, because we have attempted to build our chimney by beginning at the top. We have, as our essayist intimates, allowed our enthusiasm to run away with our judgment. We have failed to have "an eye to the hazard." We seem to have forgotten that the people, the masses, have the power to think and compare, and that the laws that have been enacted are, in their relation to dentistry, conservative rather than protective. While they are intended as protective measures, it is the public, and not the dentist, that receives the protection. The paper just read before you will have served its purpose well if it shall come as a warning to those who look upon the dental laws under which we are now working as a wall of circumvallation within which we are to entrench ourselves at our own sweet will.

The law as it stands upon our statute-books is all we need. Let us not disturb it. Let us respect it. According to the argument presented by our learned legal friend, and which he has established and verified by citations and opinions from the highest tribunal of the nation, dental legislation is not intended as a means of hedging about and fostering a close corporation of trade-unionists seeking self-aggrandizement, nor is it designed to further private schemes.

Let me quote from the paper a statement that is as true as that there is a sun in the heavens: "Laws are to be enforced with judgment and clemency, and by persuading the spectator that the prosecution is aiming at the suppression of public evils, and not the oppression of individuals." But how are we to persuade him? I opine that the chief difficulty in the enforcement of the law as it stands to-day is that the "spectator," the public, has a way of its own of looking at these questions, and refuses to accept any other interpretation of such laws as they are commonly enforced than in the light of persecution, and, so viewing them, governs itself accordingly.

Another obstacle in the way of a popular enforcement of our restrictive law is the superstitious awe with which the masses repose their confidence in the science of medicine, and regard with distrust anything of similar nature that is not well within the pale of that vocation. In other words, the confidence of the people must be obtained before that popular sympathy can be gained which insures the co-operation of the public that is so essential to the successful operation of restrictive laws.

In this latter statement lies the latent force which determines the whole question,—viz, the unwavering confidence of the people, which can be obtained only by convincing them that we are worthy their good opinion by our attainments and by our deportment before them. So long as dentists resort to all the tricks of commercialism to further their aims and satisfy their greed for money, the public will rate us accordingly. If we resort to trade methods to gain the attention and secure the patronage of the community surrounding us, the public will rightly continue to class us as mere tradesmen.

A few years ago "recognition" was the slogan, the tocsin sounded at every private or public assemblage of dentists. Thank God we hear very little of it now. And why the change? For answer, look around you. Do you not see in the faces of those who are now entering our ranks from the alumni of the modern dental college the answer? Has not the steady march forward in the elevation of the standard of educational requirement and the extension of the course of study already evinced the reason? And does it not also awaken in your mind a glimmer of hope that in this direction lies the solution of the whole problem?

Those who entered our professional ranks prior to 1879, and have borne the burden and heat of the day, have come to realize that no mere legal enactment will ever lift our profession into that much-coveted position of equality with the profession of medicine,—nor will it secure to us the trust and confidence of the populace

which we so much desire. Laws we must have; they are the natural concomitant of all progress, either civic or scientific; but if we as a profession assiduously cultivate the confidence of the masses by gentlemanly professional deportment and by higher and still higher educational attainment the laws and their enforcement will take care of themselves.

Dr. F. A. GREENE, Geneva, thought dental societies should be careful in the matter of prosecuting illegal practitioners, because they were liable to lose the confidence of the people and enlist their sympathies on the side of the defendant. He had had considerable experience as a member of the Law Committee, and had frequently been found fault with because he would not proceed upon complaint without the necessary evidence, and without any willingness on the part of the complainant to help the prosecution. If we are to bring a case and prosecute it successfully we must be very sure of our evidence. If this is clear and indisputable, the probability is that we can convict, but in many cases it is better to go to the man who is practicing illegally and, by stating the law to him, endeavor to persuade him to retire from the practice or leave the state rather than stand a suit which will involve him in trouble and expense.

Dr. C. W. STANTON, Buffalo. We are now in the midst of a campaign of education upon the action of dental laws. We have a law now, and a good one, but we must see that no changes are made in it at any session of the legislature. The State Medical Society are in the same campaign, and they have a man in Albany at each session of the legislature to whom they pay three hundred dollars a year to watch all bills that may be presented. Besides this, they have an arrangement with the governor, who has promised them he will not put his signature to any bill without giving them notice, so that they may signify their disapproval if they consider the proposed law mischievous.

The dental law of South Carolina was, he thought, better in some features than that of any other state. The business of looking out for illegal practitioners is turned over to the Commissioners of Education, and the fines which may be collected for illegal practice are devoted to educational purposes.

Dr. S. ESCHELMAN, Buffalo, thought dental laws were about as well enforced as other laws, and the sympathies of the community worked no more frequently to hinder their success than they do in the case of other laws. When any of us know of any trouble brewing for a friend we will be apt to help him if possible. This is human nature, and of universal application. If an acquaintance in whom we take any interest should be in danger of arrest, we would in many cases not be unwilling to aid his escape if it could be accomplished.

His feeling about the extending of educational requirements for dentists is that we have gone far enough in that direction. To make the entrance more difficult would be practically to prohibit men from fitting themselves for the profession. He believed that every one desirous of practicing dentistry should first take the M.D. degree, and then spend two years in learning the special dental

branches, including prosthetics. Without the medical education, no dentist should venture to give an anesthetic, because otherwise he cannot be capable of determining whether a patient is in a condition in which it would be safe, nor in case of an accident could he determine the proper remedies to administer.

On motion, the subject was closed and convention adjourned till 2 P.M.

(To be continued.)

SOUTHERN CALIFORNIA DENTAL ASSOCIATION.

THE fourth annual meeting of the Southern California Dental Association was held in Los Angeles, October 8 and 9, 1901. It was the most interesting and largely attended meeting ever held in Southern California, twenty new members joining the association. The reports of officers showed the society to be in a very prosperous condition.

The following officers were elected for the ensuing year: E. G. Howard, Los Angeles, president; M. E. Tabor, Riverside, first vice-president; M. Evangeline Jordon, Los Angeles, second vice-president; J. M. White, Los Angeles, treasurer; L. E. Ford, Los Angeles, secretary.

The most important feature brought before the society at this meeting was the subject of the Care of Children's Teeth. This society has undertaken to distribute to each child in the public schools throughout Southern California, between the ages of six and fifteen years, a pamphlet, which shall be taken home to the parents. In this pamphlet has been incorporated such matter as all parents should be familiar with in the care of children's teeth,—the hope being that by the education of the parents in this respect the children will be benefited. Part of the matter used was taken from a pamphlet entitled "Teeth," issued by the California State Dental Society.

L. E. FORD, *Sec'y*,
307 S. Broadway, Los Angeles, Cal.

BIRMINGHAM (ENG.) DENTAL STUDENTS' SOCIETY.

THE sixteenth annual meeting of the Birmingham Dental Students' Society was held at Birmingham University, on Thursday evening, October 24, 1901, the retiring president, Mr. Cale Matthews, being in the chair.

The reports of the secretary and treasurer were laid before the meeting, and showed that the society had had a very successful year.

The following gentlemen were elected officers for the coming year: Karl Daman, president-elect; F. W. Broderick, hon. secretary; R. H. Astbury, hon. assistant secretary; W. Bowater, hon.

treasurer. Committee—Messrs. E. V. Tomey, J. H. Harris, and E. J. Nicholls.

A hearty vote of thanks was passed to the retiring officers for the excellent work that they had done during the past year.

Mr. Cale Matthews, the retiring president, then read his valedictory address, in which he said that he hoped that students on becoming qualified would not wholly forsake their *alma mater*, but would continue active members, as far as possible, of the society, and also—by joining the British Dental Association—would do their best to advance the cause of their profession.

Mr. H. Percy Joscelyne then opened the session with a very excellent address to the students, urging them to take up when qualified some work outside of their professional sphere, as this was the way to educate the general public to understand the position that the dental profession ought to take among its fellows.

F. W. BRODERICK, *Hon. Sec'y.*

DENTAL SOCIETY ANNOUNCEMENTS.

JEFFERSON COUNTY (N. Y.) DENTAL SOCIETY.

THE annual meeting of the Jefferson County Dental Society will be held at the Woodruff House, in Watertown, N. Y., on Monday, December 9, 1901.

All members of the dental profession in good standing are cordially invited to attend.

RAYMOND F. COSLER, *Sec'y.*

EDITORIAL.

MECHANICAL DENTISTRY.

THE aphorism variously attributed to Voltaire, Talleyrand, Harel, and others, that "Speech was given to man to conceal his thoughts," was and is undoubtedly true as applied to the diplomatic use of language, but in an allied sense it seems to be equally true that certain forms of expression serve to obscure the ideas they are intended to convey, and because of their inherent lack of clearness tend to perpetuate errors of meaning. The phrase "mechanical dentistry" is a conspicuous example of the latter class. It is presumed that the term under consideration was intended to include all those constructive procedures in dentistry necessitating the use of tools and materials, and because of the constructive character of the work and the fact that it necessarily involves the use of tools and materials the term mechanical has been used to designate it, and the workman has been called a mechanic. We criticize the

designation for the reason that it not only fails to convey a correct meaning, but, on the contrary, suggests an erroneous one.

The terms *mechanic*, *mechanical*, etc., are vitally and indissolubly related to the idea of a machine,—with the construction of a product which is not essentially the result of an educated muscular and mental co-ordination that is independent of mechanical contrivances for its execution. This is a fundamental difference in kind, and has no bearing whatever on the question of relative degrees of skill,—for mechanical genius and skill of the most consummate character are developed, and are indeed requisite, in the production of mechanical results of a certain type or class; but it is not the sort of skill that is most useful in the practice of dentistry. The essential object of the machine and of the mechanic, in the strict sense of the term, is the multiplication of results with unvarying uniformity; the machine must turn out its product, perform its function, under given conditions with precision and accuracy or it is a failure as a machine, and it is the highest virtue of a mechanic to be able to contribute to the same ends. It is this ideal of uniform repetition of results, the objective feature of the training of the skilled mechanic, which constitutes the fundamental difference between the craft of the mechanic and the art of the dentist.

The obvious factor which has classified the dentist and the mechanic to a certain extent under a common designation is the mechanical means which both employ in the attainment of their ends, and the error has arisen in considering the means instead of the ends in the matter of a designation.

The restorative prosthetic work of the dentist necessarily involves the use of tools and machinery in its constructive phases, but the objective end of their use is diametrically opposite to that of the mechanician; instead of uniformity of result as an ideal, that of the dentist is infinite variability. And it is the factor of variability in his work that necessitates elements of character and a system of training for the dentist as different in character from that needed by the mechanic as the education of a portrait-painter differs from that of a house-painter. Or, to apply the simile to the product, dental work differs from mechanical work as the portrait by an artist differs from a chromo or a photograph. There are, unfortunately, mechanical dentists in the strict sense of that term,—dentists who buy one hundred or more sets of artificial teeth at one time, all of the same shade and from the same mold, and insert them with unvarying regularity in the mouths of their fellow-citizens at a more or less uniform rate per capita; but we are concerned with dentistry as a fine art, and not as a mechanical handicraft.

It is cause for much encouragement that the discredit into which the so-called mechanical department of dentistry had fallen through the indiscriminate misuse of vulcanite is gradually being eliminated through the development of modern methods in restoration by crown- and bridge-work, and the more recent introduction of porcelain as a prosthetic material. The development of skill in the use of these methods and materials has gone much farther than the production of skill in the technical manipulation of the materials employed. It has created a recognition of artistic possibilities upon the part of dental operators, and a corresponding appreciation upon the part of the public. The inexorable demands of type, age, and temperament have compelled a study of color, form, and correspondence in not only partial, but entire restorations of the human denture, and brought about a clearer recognition of the fact that the mechanical idea of uniformity of result is incompatible with the conditions of infinite variety which the problems of prosthetic restoration present for solution.

The tendency to generalize, to express conditions by a formula, to seek out the natural law expressive of the relations of phenomena, seems to be a necessary quality of the human mind, yet one which frequently gives rise to error and difficulty. The law enunciated by Bonwill, in effect that the human mandible was constructed upon the basis of an equilateral triangle, has been shown to be true only in so far as it expresses an ideal condition, the variations from which are the real factors with which we have to deal in individual cases. It is these individual differences which furnish the problems the dentist has to solve, and that place his work, both as to its object and method, in a class distinct from that of the mechanic.

What, then, should be the training of the dentist with respect to the manual technic phase of his work? He should undoubtedly have such training as will make him skilled in the use of tools. He should develop such manual dexterity in the use of tools that he can construct with accuracy the restorative appliance his mind has planned; but his manual training should be so conceived and directed that his training will develop him as an artist and not only as a mechanic. If a shop-work apprenticeship be deemed valuable as a preliminary discipline for the training in precision and in the use of ordinary hand tools, it should include only in a minor degree those operations of which complicated machinery is an essential factor. If drawing be selected as a means of manual and artistic training, it should be freehand and not mechanical, for the work of dentistry demands that quality of individuality in the result which

characterizes the work of the man and not of the machine,—of the artist mechanic, not the mechanic.

The importance of manual training for the dentist is now generally recognized, and as operative and prosthetic procedures multiply and become more complex in the evolution of dental art the training of the dentist with a view to giving him a more precise and delicate manipulative skill will be increasingly necessary. The problem of how to develop not only a high degree of skill, but especially the right kind of skill, must be considered and solved; and the first fact to be realized and taken into account is that the type of manual exercise for the dentist must be selected with as much care as is the kind of intellectual training he is to receive. Both must be adapted to the end of making dentists, but there is a type of manual training which is not only unsuited to the needs of dental education, but which will defeat that end by producing a skilled mechanic rather than a skilled dental operator.

We may classify these two types of manual training as the qualitative and the quantitative, and under the first include all operations which tend to develop skill without complex mechanical aids; under the second designation would be included all manual exercises which depend for their precise execution upon the use of such mechanical aids. The first would be illustrated by the ability to draw a straight line without a rule, and the second by the drawing of a line with the aid of a rule. In both cases a straight line is the result sought, but in the first case it represents a high degree of precise muscular balance and skill, whereas in the second it represents little or none. The object, then, is the development of skill of a particular kind as the first consideration,—skill analogous to that of the artist that is capable of producing results each of which, while perfect of its kind, yet bears the stamp of an individuality of its own and of the artist who created it. It must be the product of the man, and not of the machine. When such a conception of the meaning of the restorative operations in dentistry is realized, the term “mechanical” as applied to any department of dental work will become obsolete.

A POINT OF JOURNALISTIC COURTESY.

WE do not object to the republication in other journals of matter that has originally appeared in the DENTAL COSMOS, provided that the customary courtesy of crediting the journal from which the paper or quotation is taken is granted us. But we do object to the practice of republishing communications and translations from the

columns of the DENTAL COSMOS without due credit and making them appear as original literature.

We make these statements for the immediate benefit of the *Pacific Dental Gazette*, which in its August issue published in full, without any reference to the DENTAL COSMOS, our translation of a French paper by A. André, of Lyons, on "Formol and its Derivatives, with their Use in Dentistry," which appeared originally in the DENTAL COSMOS for July. The November issue of the *Gazette* contains a number of similar excerpts from the DENTAL COSMOS without credit.

BIBLIOGRAPHICAL.

STUDIES OF THE INTERNAL ANATOMY OF THE FACE. By M. H. CRYER, M.D., D.D.S., Professor of Oral Surgery, Department of Dentistry of the University of Pennsylvania. Price, cloth, \$1.50 net. Philadelphia: The S. S. White Dental Manufacturing Company, 1901.

Readers of the DENTAL COSMOS have become more or less familiar with some of the results of Dr. Cryer's investigations of the anatomy of the facial region. These and his more recent studies have been amplified and collated in the present volume. Like all scientific work, that which has for its object the interpretation of natural phenomena, the result is an unfolding, as it were, of new sources of knowledge and the exposition of many new facts within the limits of the field of investigation.

The anatomy of the head, and especially of those regions related to the oral cavity, constitutes a field upon which the dentist should be fully and accurately informed. Much of the descriptive anatomy in general text-books is erroneous and unreliable in so far as it is related to the oral cavity and its adnexa. Dr. Cryer's work supplies a deficiency in descriptive and surgical anatomy which will be appreciated not only by the dental surgeon, but by the laryngologist and rhinologist as well, for the reason that the book is a record of results obtained by extensive dissection and study of the cadaver, and is therefore a record of ascertained facts, not of theories. One fact of especial practical importance established by the studies recorded in this volume is the inadequacy of "average" or diagrammatic anatomy as a guide to the actual conditions found in the bones of the facial region.

The illustrations, of which there are about one hundred and fifty, are half-tone reproductions from photographs of specimens, and their faithfulness to nature gives them a teaching value second only

to a study of the actual dissections from which they were taken. The book, which cannot fail to become an authority in the field of anatomy embraced in its scope, is handsomely printed on coated paper, bringing out clearly every detail of the illustrations.

IRREGULARITIES OF THE TEETH AND THEIR TREATMENT. By EUGENE S. TALBOT, M.D., D.D.S., Professor of Dental and Oral Surgery, Northwestern University Woman's Medical School, Chicago, etc. Fourth Edition, pp. 537, with 580 illustrations and index. Price, cloth, \$5.00. Philadelphia: F. A. Davis Company, 1901.

The general character of Dr. Talbot's work in the study of irregularities of the teeth is well known through his several publications bearing on the subject. In the volume before us we have collected presumably those portions of his writings which the author deems to have immediate relation to the topic of dental irregularities. The book is the record of a vast amount of labor and research, partly by the author and partly by others at his instigation. His fondness for the theory of degeneracy gives direction to much of his reasoning and a certain bias to his findings which do not add to their scientific value. A certain authority on gout has issued from time to time lists of dietary articles unsuited for consumption by the sufferer from gout. This dietary *index expurgatorius* has grown to be so inclusive of available foods that were it strictly obeyed the gouty sufferer might perish of starvation. In like manner the stigmata of degeneracy recognized by Dr. Talbot are growing to such numerical dimensions that the inevitable conclusion is being forced upon us that we are all degenerates.

The purpose of the work, as indicated in the preface, is to show that irregularities of the teeth have a constitutional origin. He holds that the theory of their local cause is "erroneous in its deductions and vicious in its effects upon practice." The perusal of his book will certainly compel belief in the constitutional origin of certain kinds of dental irregularity, but it by no means proves that very many dental irregularities are not purely local. The relation of mouth-breathing to contracted maxillary arches and the question of "jumping the bite" are topics upon which a respectable proportion of the dental profession will continue to differ with Dr. Talbot, and it is unnecessary to attempt a discussion of these subjects here. The practical treatment of cases is portrayed exclusively by the author's methods, and the work of others in this field is omitted. The book is most interesting as an exhibit of individual opinion, and of how far afield it is possible to go in the treatment of a specified

topic. Every dentist should read the book for the general information which it contains about degenerates and how they happen to exist, but for definite and practical directions as to irregularities of the teeth and their treatment he will need to consult a book dealing more directly and specifically with that subject.

ANATOMY, DESCRIPTIVE AND SURGICAL. By HENRY GRAY, F.R.S., Lecturer on Anatomy at St. George's Hospital, London. Revised American from Fifteenth English Edition. Imperial octavo, 1246 pages, with 780 illustrations. Price, with illustrations in black, cloth, \$5.50 net; leather, \$6.50 net. Price, with illustrations in colors, cloth, \$6.25 net; leather, \$7.25 net. Philadelphia: Lea Bros. & Co., 1901.

Anatomy is by no means a fixed science, either as to its data or as to the mode of its presentation. New anatomical facts are being constantly brought to light, and the process of evolution in methods for teaching anatomy is rapidly bringing forward new suggestions for the delineation and presentation of the subject in a pedagogical way. These factors make necessary the production of new works on the subject or the revision of the old, in order that our textbooks may contain the best to be had on the subject up to date.

A new edition of Gray is always cordially welcomed, because of the established position which the work has from its first publication held and maintained as the standard text-book on anatomy.

Notable features of the new edition are extensive amplification of the portions dealing with the brain, spinal cord, and viscera, the addition of 231 new engravings, and the lavish use of colored illustrations for the better elucidation of the text. One conspicuous error which has been perpetuated through the several editions is Fig. 68, intended to portray the lower jaw at puberty, while, as a matter of fact, it illustrates a jaw at from six to seven years of age, the deciduous teeth all being in position and the first permanent molar in addition. This should be corrected. One of the more recently introduced illustrations (Fig. 73) perpetuates a common error of terminology by using the adjective maxillary in place of the noun maxilla in the designation of the superior and inferior maxillæ respectively. Errors of terminology should find no place in a standard work. As bearing upon the point in question, why should not the jaws be separately designated by the term maxilla for the upper and mandible for the lower, as is generally done in comparative anatomy and ethnology?

Commendation of the work as a whole would be superfluous in view of its well-known excellence.

OBITUARY.

DR. JAMES G. VAN MARTER.

DIED, October 21, 1901, at his home in Rochester, N. Y., of apoplexy, JAMES GILBERT VAN MARTER, D.D.S., in his sixty-seventh year.

Born in Lyons, N. Y., April 4, 1835, Dr. Van Marter had the benefit of a good education, graduating from Williams College in 1861, receiving the degree of B.A. at graduation and afterward the degree of M.A. Moved by patriotic impulse, he entered the army and was commissioned captain in the Twenty-second New York Cavalry. After the war, his attention being turned to the profession of dentistry, he took a short term of pupilage in a Rochester dentist's office, and then matriculated at the Ohio College of Dental Surgery. Having graduated, Dr. Van Marter went to Europe, and settling in Basle, Switzerland, soon built up a lucrative practice. After six years in Basle he moved to Florence, Italy, and afterward to Rome.

His practice was very largely among the nobility and royalty. The late Empress Frederick and Pope Leo XIII were among his patients, the latter having conferred upon him a decoration. One of the pioneers of American dentistry in Europe, by his natural refinement, culture, and education he shed luster upon the profession and contributed much to the high esteem in which American dentists are held throughout the world.

He was one of the founders and at one time president of the Society of American Dentists in Europe, and was a member of several other dental societies, also of the Royal Academy of Medicine of Rome, Italy, and of the Imperial Archæological Society of Berlin and the Royal Archæological Societies of Rome and Athens. He was an enthusiastic art and book collector and purchased many valuable paintings while abroad.

About eight years ago he relinquished his practice and returned to the United States, making his home in Rochester. For the last four years he was in failing health, but not confined to the house, so that it was to all a surprise when death so suddenly overtook him. He was married in 1866 to Sophie Albers, of Warsaw, Ill., and his wife and three children survive him. His eldest daughter is the Countess of Tankerville, of Chillingham Castle, Eng. Another daughter, Mrs. Tytler, lives in the state of Washington, and his son, Dr. J. G. Van Marter, physician, in Savannah, Ga.

THOMAS A. LONG.

DIED, November 5, 1901, at his home, in Oxford, Md., THOMAS ALEXANDER LONG, aged sixty-five years.

Mr. Long, although not a dentist, was a considerable actor in one of the most momentous events in the history of dentistry, an event which revolutionized the practice,—namely, the introduction of the dental engine. He was the man who sold the first dental engine (the old Morrison) to dentists. His record of the trip which he made to introduce the "new-fangled machine" shows that the first sale was made April 17, 1872, and that the purchaser was Dr. A. D. Turner, of Binghamton, N. Y.

Aside from his connection with the introduction of the dental engine, with which his name is indissolubly linked, Mr. Long was personally known to probably more dentists in the United States than any other man, and wher-

ever known he was esteemed. For a third of a century he traveled the country selling dentists' supplies, his routes at various periods taking him into every section, from the extreme East to the Pacific Coast, from the Lakes to the Gulf. For more than twenty years also he had charge of the exhibits of The S. S. White Dental Mfg. Co. at nearly all the important gatherings of dentists. Always intent on serving his patrons and his house to the best of his ability, he studied his business deeply, and consequently understood it thoroughly. When a new appliance was brought out, it was his habit to investigate its every relation, to master its every detail of construction and use. Naturally his exploitation of it to possible buyers was not the glib reeling off of stereotyped phrases which had been drilled into him, as is too often the wont of salesmen, but the careful, painstaking statement of one who knew what he was talking about. That was the secret of his success. He knew, and those who listened knew he knew. Many a dentist who has gotten into trouble through not thoroughly understanding some piece of mechanism has acknowledged his debt of gratitude to Mr. Long for setting him right.

Thomas A. Long was born at Shaw's Landing, Venango county, Pa., October 21, 1836. After receiving a common-school education he learned the trade of cabinet-maker, but never followed it as a vocation. At the age of twenty-one he became a clerk in the drygoods store of E. C. Thompson, of Meadville, Pa., and afterward in the grocery store of Leon C. Magaw, of the same place. He married October 12, 1860, a relative of his employer, Miss Willie Anna A. Magaw, who survives him, with their two children, Dr. Alexander P. Long and Miss Sophie E. Long. During the Civil War he served as clerk to his brother-in-law, the late Commander Samuel B. Magaw, U. S. N. When peace was declared, Mr. Long removed to New York city, where he engaged with Dr. I. W. Lyon to travel in the interests of Lyon's Tooth Tablets. About three years later he went upon the road for Johnston Brothers, for the sale of dentists' supplies.

In 1879, August 27, he entered the employ of the late Dr. Samuel S. White. From that date to his death he was identified as traveling salesman with the house founded by Dr. White, in which relation he rendered invaluable service.

Several years ago Mr. Long's love for the sea led him to acquire a summer home at Oxford, Md., which in time grew to be his permanent residence, except during the midwinter months. On Saturday, November 2, he completed at Baltimore a trip of several weeks' duration. The next evening he took the boat for Oxford. On board the boat he had an apoplectic attack, from which he had suffered once or twice previously. He was tenderly cared for and removed to his home, but he was beyond mortal aid, and the end came about twenty-four hours after the seizure.

It was a rare spirit whose light was quenched when Mr. Long's eyes were closed in death. He possessed in a high degree the qualities of character which attract others. No man had a wider circle of real friends. His relations with his patrons were not those of business only. All over the land are dentists with whom he was on terms of close personal intimacy. His genial qualities assured him a warm welcome to their family and social circles. The children, with whom he was an especial favorite, will miss his visits. No better testimony to his character can be offered than this. He was earnest, sincere, clear-headed, energetic, genial, and warm-hearted, hopeful and helpful, of spotless integrity,—a man to enlist and hold the warm esteem

of those with whom he came in contact. In his death his family has lost a devoted husband and father, The S. S. White Dental Mfg. Co. a faithful and efficient employe, his associates a friend whose memory will long be cherished.

F. L. H.

RESOLUTIONS OF REGRET.

DR. CHAS. S. INGLIS.

THE following resolutions of regret were adopted by the Central Dental Association of Northern New Jersey:

WHEREAS, It has pleased Almighty God, in His wise providence, to remove from our midst our beloved associate and fellow-member of this the Central Dental Association of Northern New Jersey; be it

Resolved, That we, the members of this society, do hereby publicly express our sympathy to the bereaved widow and loving helpmate of the deceased; and be it also

Resolved, That we lament our loss, since by the death of Dr. Inglis we have personally lost a very dear friend and associate and the society one of its most promising and useful members, the state one of her favored sons, a professional man of rare attainments, dignified, discreet, brilliant, and attractive; and, therefore, be it further

Resolved, That the above preamble and resolutions be embodied in the minutes of this society; that a copy be transmitted to the widow, Mrs. Inglis, and also that a copy of the same be printed in the Paterson newspapers.

FRANK L. HINDLE, *Chairman*,

P. G. VOEGTLEN,

J. S. VINSON,

F. EDSALL RILEY,

WM. E. TRUAX, *Executive Committee*.

DR. ZACHARY T. SAILER.

THE following resolutions were recently passed by the Alumni Association of the New York College of Dentistry:

WHEREAS, We have learned of the death of our esteemed fellow-member and treasurer, Dr. Zachary T. Sailer, who was for many years one of the most earnest and active members of the Alumni Association of the New York College of Dentistry; and

WHEREAS, We feel that in the demise of Dr. Sailer our association has sustained a serious loss, and a place is made vacant that it will be hard to fill; that we have been deprived of an able adviser and staunch friend, a man of sterling integrity and professional worth; therefore be it

Resolved, That we do hereby express profound sorrow and regret at the seemingly untimely removal of our respected brother. We will miss his kindly presence, his able advice and loyal service, and his memory will ever be held in tender regard.

Resolved, That we extend to the widow and daughter of Dr. Sailer our sympathy in their bereavement, and that these resolutions be spread in full upon the minutes, and a copy, suitably engrossed, presented to the family.

JOHN I. HART, *Pres.*

J. OSTRAM TAYLOR, *Sec'y.*

BENJAMIN C. NASH, *Chairman*,

BENJ. F. LUCKEY,

CHAS. A. DUBOIS,

Committee.

DR. W. H. MORGAN.

RESOLUTIONS of regret were recently passed by the Tennessee Dental Association as follows:

WHEREAS, With profound regret the Tennessee Dental Association is called upon to notice the death of Dr. W. H. Morgan, an old, tried, and faith-

ful member, it is meet and fitting that it should place on record its appreciation of his long and faithful service as a member, and of his far-reaching, earnest, and valued services to the profession he loved.

His great earnestness in professional work, his faithfulness as a member and officer of this association, his manliness and friendliness, well merit our most profound appreciation and respect and his title to the distinction of being honored as the "father of dentistry in Tennessee."

Resolved, That by the death of Dr. Morgan the dental profession at large has lost a great man, and this society a fast and good friend.

Resolved, That, bowing in submission to Him who doeth all things well, we hereby express our heartfelt sympathy with his bereaved family; and be it further

Resolved, That a copy of these resolutions be transmitted to his family and published in the dental journals.

J. L. MEWBORN,

J. P. GRAY,

A. R. MELENDY, *Committee.*

PERISCOPE.

ANTIDOTE TO STRYCHNIN.—Lard given internally is an efficient antidote to strychnin, and it can be found in every household.—*Exchange.*

HEMOSTATIC AFTER TOOTH-EXTRACTION.—Cotton-wool soaked in oil of turpentine and pressed into the bleeding cavity after tooth-extraction will check the hemorrhage promptly.—*Medical Summary.*

DARK JOINTS.—Dr. W. W. France says, in *Items of Interest*, that he packs the joints of his vulcanite plates with about a quarter of a sheet of gold foil, and that he has never had a dark joint since he commenced its use. Where the space is small one thickness of the gold pressed in with the edge of a penknife blade is quite sufficient. Tin foil will do equally well.

A NEW ALLOY.—According to the *Zahntechnische Reform*, one hundred parts of copper and six of antimony form an alloy with properties very much like those possessed by gold. The antimony is added to the melted copper and the whole is covered with charcoal ashes, magnesia, and lime. It can be rolled and worked like gold; its color is like that of gold, and it is said not to become dark with age.

INTRARHACHIDIAN ANESTHESIA.—Although this method of producing general anesthesia has some advantages over chloroform and ether, its use has not as yet become general on account of the difficulty of sterilizing the cocain solutions, without producing decomposition of the drug. Another great drawback in spinal anesthesia lies in the danger of infection, and hence the most strict attention should be directed to the disinfection not only of the syringe and needle, but also of the field of operation.

"XEROSTOMY"—DRYNESS OF THE MOUTH.—In an interesting article by A. Thioly-Regard, read before the Swiss Odontological Society, the essayist describes under the name of "xerostomy" an abnormal dryness of the oral mucous membrane. He quotes Dr. Kirstiny, who has made an exhaustive study of this pathological condition, and who presented the result of his observation to the German Association of Physicians in September, 1900.

The principal symptom of this disease is an excessive dryness of the mouth due to the absence of salivary secretion, but this condition does not necessarily imply a complete arrest of salivary secretion. The absence of saliva brings about a rapid disintegration of the teeth from carious invasion.

Affliction, pain, and fever are also predominant symptoms of this affection. The treatment has not been discussed, and we are in the dark as to the best means of combating this malady.

Dr. Thioly-Regard affirmed that the dryness of the mouth can be caused by the use of prosthetic appliances, which in certain persons of peculiar

idiosyncrasy causes intense thirst accompanied with fever. This would be caused by nervous fatigue and by the pressure of the plate against certain terminal nerve-fibers, which in turn would bring about reflex glandular disorders. Several cases of this nature have already been described, among them some by Drs. Delphin and Bardet.—*Schweizer. Vierteljahrsschrift für Zahnheilkunde.*

MATCHING SHADES IN PORCELAIN.—There is nothing that requires greater care or more prolonged experience than matching shades in porcelain. And just in proportion to the lowness of the temperature at which porcelains fuse is it difficult to match shades. Porcelain of the same composition when fused at a higher temperature than the porcelain represented in the sample will have some of the coloring matter burned out of it, and the result will be a shade which does not match. Just in proportion as porcelains fuse at a higher temperature, is it easier to match shades and tints.—E. T. DARBY.

ECTHOL.—It has been claimed that this drug possesses the property of preventing the formation of pus, and lately Dr. P. LECTOURE, in *Der Kinder-Arzt* for May, 1901, speaks in very high terms of its powers in this respect. The remedy can be administered internally or applied externally, and has proved to be of great value in the treatment of erysipelas, pyemia, and all affections in which pus is present; its use in these cases has given satisfactory results.

DIFFERENCE BETWEEN PORCELAIN AND GLASS.—Porcelain is not a chemical compound; it is a mechanical mixture,—a solidified suspension of two insoluble, infusible substances in a fusible silicate which acts as a flux or bond and holds them together. Glass may be considered as a transparent silicate of one or more bases.—GEO. H. WILSON, in *COSMOS.*

ADVANTAGES OF EUCAIN OVER COCAIN.—Eucain can be sterilized by boiling, and it produces a degree of anesthesia of satisfactory intensity and duration. It is less toxic than cocain, and can be used with impunity for weak patients. The technique of administration and dosage are similar to those of cocain.

ALCOHOL AS A DISINFECTANT.—Alcohol in proper dilution is a very efficient disinfectant, its disinfecting properties depending partly upon its desiccating action, and partly upon a distinct toxic influence upon the bacteria. In efficiency it may be classed between corrosive sublimate and carbolic acid. The best solution for the disinfection of the hands is slightly acidulated eighty per cent. alcohol.—*New York Medical Times.*

ELECTRICAL ANESTHESIA.—For three months MM. L. R. REGNIER and G. DIDSBUY have carried on experiments with the purpose of ascertaining whether it were possible to accomplish local anesthesia with the aid of electric currents of high frequency and great intensity. The results obtained from their experiments, which were made in extracting teeth, confirmed the statements already made by Professor d'ARSONVAL. In extracting the incisors and canines the operation was almost entirely painless; the results in the case of molars were variable; the first molars are generally taken out without pain, but in extracting the second the method is less successful.—*Exchange.*

VIOFORM.—This preparation possesses, like iodoform, the property of keeping wounds absolutely dry and free of germs, and beyond this has the advantage of not having any disagreeable odor. Vioform is capable of replacing iodoform in all respects in rectal and vaginal surgery, as well as in operations about the mouth and other places where contamination of the wound surfaces is unavoidable.—*Münch. med. Wochenschrift.*

ANTIDOTE FOR FORMALDEHYD.—In view of the fact that formaldehyd is coming more and more into general use as a disinfectant and antiseptic, cases of poisoning from it will become more frequent. An easily accessible and reliable antidote is ammonia water. It may be given in the form of ammonia water (a few drops well diluted), or the aromatic spirit, or a solution of ammonium acetate.—*Merck.*

CARE OF HANDS.—In order to keep the hands smooth, Caspar recommends (in *Texas Medical Journal*) the following:

R—Ol. rosæ, 15 drops;
Glycerini, 1 drachm;
Sp. myrciæ, 3 drachms;
Ol. cajuputi, 20 drops. Misce.

Sig.—To be used on the hands every night before retiring, and before going out in the cold air in the morning.

—*Medical Fortnightly.*

ADVISABILITY OF PRESERVING A REMAINING LOWER TOOTH.—Do not extract the last lower tooth in any mouth if it has any kind of a healthy attachment to the jaw. Clasp it properly and you will get the blessing of a grateful patient; extract it, and the chances are you will have to make excuses about full lower plates the balance of your days.—*Dental Review.*

TO CHECK HEMORRHAGE.—Calcium chlorid, in does of 8 to 16 grains every two to four hours, should be tried in all forms of persistent hemorrhage, especially hemoptysis, hematuria, and intestinal hemorrhage of typhoid fever,—for this salt increases the coagulability of the blood. It should be remembered, however, that this drug should not be used more than three days continuously, for its prolonged use decreases the coagulability of the blood.—*Medical Brief.*

SYPHILIS OF THE LYMPHOID TISSUE IN THE BASE OF THE TONGUE.—Dr. G. Hudson Makuen, of Philadelphia, reports (*Journ. Amer. Med. Assoc.*, August 17, 1901) a case in which the tertiary manifestations were confined entirely to this tissue, and Dr. Casselberry, of Chicago, in opening a discussion upon a paper which was read at the last meeting of the American Medical Association, mentioned a similar case in which, from a mistaken microscopical examination, a large mass had been removed after pharyngotomy, under the supposition that it was a case of carcinoma. Dr. Stout, of Philadelphia, referred to a case in a trained nurse who had caught the original infection by sucking milk from an abscessed breast.—*Amer. Journ. of the Med. Sciences.*

DISEASES OF THE MAXILLARY ANTRUM.—Dr. W. E. Casselberry, of Chicago, reports two cases of serous disease of the maxillary antrum (*Laryngoscope*, July, 1901), and discusses the subject in its general aspects, giving a bibliography of its literature. He concludes that the diagnosis of accumulation of serum in the antrum without its distention or deformity must be based upon aspiration, the transillumination test being indecisive. The discrimination of a free collection of serum from a cyst may be quite impracticable, even when the sinus has been widely opened, and sometimes it has been impossible to determine the point even on autopsy. The treatment may consist in removing any polypi, resecting enlarged middle turbinated bodies, removing any other obstruction of the opening of the orifice of the sinus, with due perforation for drainage. Should this fail, an opening in the anterior wall of the sinus should be made sufficiently large for palpation, and then curetting would seem to promise a cure and perhaps forestall what would ultimately become an empyema.—*Amer. Journ. of the Med. Sciences.*

METHOD OF OBTAINING ACCURATE LOWER IMPRESSIONS.—The impression is taken with ordinary beeswax. When the impression material is nearly down to its place, place the fingers well back in the mouth and press the buccinators well outward; then force the material firmly down on the jaw at this region, also below the region of the canines. Press the wax well down on the lingual sides all around. Remove and cool. Cut away from the lingual side all surplus in order that the muscles shall have a free normal movement. Fill this impression with thin plaster of Paris, replace in the mouth, press firmly down, at the same time instructing the patient to thrust the tongue forward out of the mouth, saying "Farther—farther—

farther," until the plaster has set. Whatever margin is shown in the cast along the lingual sides will be the definite margin for the finished plate, as by this method you have obtained the full action of all the elevating muscles.—*Dental Review*.

LUG ON CLASP PLATES.—In clasp plates always have a lug extending on the grinding surface, so as to prevent the clasp from injuring the tooth, and also because the patient can bite fifty per cent. harder, there being no undue stress on the soft tissues.—*Dental Review*.

SUPPURATIVE PAROTITIS.—Dr. Francis R. Packard reports (*Journ. of the Amer. Med. Assoc.*, August 17, 1901) two cases of suppuration of the parotid gland, with pus in the external auditory canal, a condition which he believes must be frequently overlooked by the general practitioner, and by others who have not made a special study of the subject, the pus being regarded as coming from the middle ear instead of reaching the parts, as it does, by infiltration through the incisuræ Santorini.—*Amer. Journ. of the Med. Sciences*.

REMOVAL OF DEVITALIZED PULP.—If there is reason to believe that minute fragments of pulp-tissue remain near the apex, dry the canal and fill with a twenty-five per cent. solution of hydronaphthol in alcohol, and with unvulcanized rubber exert enough pressure to saturate the remaining tissue. Then dry the canal, moisten with eucalyptus, and fill with gutta-percha points.—HAROLD CLARK, *Dominion Dental Journal*.

SETTING OF CROWNS AND BRIDGES WITH GUTTA-PERCHA.—Set all banded crowns and bridges with pink base-plate gutta-percha. First, because it acts as a cushion between the crown and root, and if any undue strain comes it will yield before it will break; it tends to cushion the blow. Second, you can be more uniformly successful and no haste is necessary; and third, as no haste is necessary, it takes away nearly all of that nerve strain which commonly accompanies the setting of a crown or bridge with cement. Fourth, the crown or bridge can be taken off at any time within five minutes for repairs or to fill an adjoining tooth. Certainly a sufficient number of reasons for at least trying the process, which, if successfully mastered, will wean you forever from setting crowns or bridges with cement.—*Dental Review*.

OSTEOMA OF THE FRONTAL SINUS.—Dr. W. D. Hamilton, of Columbus, Ohio (*Journ. Amer. Med. Assoc.*, January 26, 1901), reports two cases in males, aged respectively thirty-six and twenty-seven years. In the latter case the neoplasm was of softer consistence, and was complicated with polypoid growths and a rather extensive suppuration. Recovery followed operation in both instances.—*Amer. Journ. of the Med. Sciences*.

REPLANTED TOOTH IN WHICH THE PULP REMAINED ALIVE.—At the last meeting of the National Dental Association, Dr. J. S. Marshall related a case of accidental extraction of a bicuspid tooth in his practice, about fifteen years ago. Immediately afterward the tooth was replanted, the pulp remaining alive up to the present time.

FATAL EFFECTS OF CHLOROFORM FOLLOWING ATTACKS OF INFLUENZA.—William Caldwell draws attention to the importance of obtaining a history of recent influenza before the administration of anesthetics, especially of chloroform; there have been many deaths from chloroform administration, and especially during influenza epidemics; very suspicious cases have occurred, which were clearly explained by the depressed condition of the nervous system and of the heart.—*Dental World*.

TO RETARD OR HASTEN THE SETTING OF PLASTER.—Dr. Beacock, of Canada, says: "To delay the setting of plaster of Paris use a little vinegar. Borax will also retard its setting. Sugar, salt, or potassium sulfate will materially

hasten its setting, as well as harden it; marshmallow toughens it. Marble-dust mixed with the plaster prevents its expansion and makes it stronger and better able to withstand heavy pressure; it is especially good for celluloid work."—*Dental Office and Laboratory*.

DIAMOND DISKS.—Mr. H. W. Messenger, L.D.S., finds diamond disks most useful for cutting up gum sections. He says that with a disk sections can be cut through with ease, thus adapting them to many cases in which they would otherwise be quite useless.—*Pacific Medical Journal*.

PAINLESS REMOVAL OF TOOTH-ENAMEL.—Removing the enamel should not cause any pain worth mentioning. By placing a short piece of rubber tubing which fits tightly around the tooth, and leaving on over night so that the gum may be pressed back, the enamel may be removed quite painlessly without even causing the gums to bleed.—*Dominion Dental Journal*.

DRYNESS OF CAVITY ESSENTIAL IN APPLYING ARSENIC.—If arsenic is applied to a cavity which has not been thoroughly dried and freed of decayed dentin and food *débris*, the immediate effect will be exceedingly painful. Arsenic cannot act if the avenues of penetration are obstructed with disorganized matter. In order to obtain a complete result from an application of arsenous oxid the cavity in which it is placed should be perfectly dry and clean, otherwise it will simply act as an irritant and will cause much suffering.

EMPHYEMA OF THE ANTRUM IN INFANTS.—Dr. Emil Mayer, in *Medical Record*, reports a case of empyema of the maxillary sinus in an infant two and a half years old. Similar cases have already been reported, but many authors hold that they are not true cases of maxillary sinusitis. Dr. Mayer, from post-mortem examinations, has come to the conclusion that antral empyema develops in infants. Statistics show that the antrum is affected quite frequently in such infectious diseases as measles, scarlet fever, and diphtheria. This makes the author think that the persistence of Loeffler's bacillus in the nose after an attack of diphtheria is due to diphtheritic antral infection.

HINTS, QUERIES, AND COMMENTS.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—In the September issue of the DENTAL COSMOS there appear, under the heading, "A Pot-Pourri of Practical Hints," elaborate directions for procedure in case the post of an artificial crown remains broken off in a root. I have several times in such cases, where the removal of the broken post seemed out of the question, made a Richmond crown without a pin,—that is, depending upon the band and cement alone to hold the tooth. This may seem hazardous, but, if the band be made to embrace the root even hardly more than half a line, the cement will hold it very firmly. I have used the same method successfully in cases where the pulp remained alive and unexposed, in preference to exposing and devitalizing. In one instance a tooth so crowned came off after nine years. I replaced it, and ten years later, having occasion to remove the same in the operation of supplying a bridge, I had to cut the band and use considerable effort to remove the tooth.

Of course the question of occlusion must be considered in attempting this operation. For incisors and canines the operation will be found feasible and satisfactory under ordinarily favorable conditions.—FRANK W. SAGE, D.D.S., Cincinnati, O.

PUBLISHER'S NOTICE.

THE ENTERPRISE OF THE DENTAL COSMOS.

OLD subscribers will recall how in 1893, at the time of the holding of the Columbian International Dental Congress, the DENTAL COSMOS opened a temporary office in Chicago; how it published a daily edition during the sessions of the Congress, some days containing over a hundred pages of the transactions; how each day the members on assembling found the printed record of the previous day's work; how the September number for that year, issued less than three weeks after the close of the Congress, contained a report of the proceedings, aggregating more than 400 pages.

In August of last year another International Dental Congress was held in Paris. The DENTAL COSMOS would have been glad to duplicate its work at Chicago, but the difficulties were insuperable. The official languages of the Congress were French, English, Spanish, German, and Italian; most of the papers and nearly all the discussions were in foreign tongues, to translate which properly in the brief time available from day to day would have been an almost impossible task. So the idea of a daily publication had to be abandoned.

But the DENTAL COSMOS was determined that the English-speaking dentists of the world should have the opportunity to know what the Congress did. It therefore made a proposition to the officials of the Congress for a duplicate of the official report, to be published under proper restrictions. The reply was to the effect that while the Congress could not accept a private proposition of this character, it could and would make terms under which any or all of the dental magazines could have the privilege for which we had asked. *The DENTAL COSMOS was the only one which met the conditions imposed.* The terms were practically those of our original proposition, but the officials of the Congress very properly made the offer open to all, and thus avoided all chance of misunderstanding or criticism.

Under this arrangement, the DENTAL COSMOS has published a very full report of the proceedings of the Congress. This publication began in the September issue of last year,—the month following the holding of the Congress,—and ends with the current number. The report has occupied 541 pages, and it is completed before the appearance of the official Transactions.

Here are two instances of world-wide interest, evidencing the enterprise of the DENTAL COSMOS whenever and wherever the real interests of the dental profession are concerned.

As in the past, so in the future, the DENTAL COSMOS will be alert to forward the progress of dental science and practice.

The volume closing with this issue, and embracing nearly 1500 pages, has contained hundreds of contributions to the solving of the practical problems of dentistry. A study of its pages will show that there has been no single number which was not worth many times the subscription price to the practical dentist.

We base our claim to the continued support of the profession on the record we have made; on the results which we have achieved. We challenge the refutation of this statement,—namely, that no other two dental journals contain as much practical information for the dentist as the DENTAL COSMOS. Every issue bristles with new facts or newly discovered facts,—scarcely a page which does not present them or throw new light on known facts. It is facts, and more facts which the dentist needs, which make a better dentist of him; facts which the DENTAL COSMOS presents to him, and which he cannot obtain elsewhere.

The great majority of subscriptions for the DENTAL COSMOS expire with this issue. Within the front cover of each expiring subscription will be found a bill for the next volume. This bill is not charged up; it is simply a notice that the time for which the subscription was paid has expired, and that it is time to renew.

We shall be obliged if renewals are sent in promptly.

THE S. S. WHITE DENTAL MFG. CO., *Publisher.*

DENTAL LEGISLATION.

REGULATIONS UNDER THE DENTISTS ACT OF NEW SOUTH WALES.

THE Dental Board of New South Wales has made a number of regulations under the Dentists Act. Among them it is stated that the following are the certificates, diplomas, membership degrees, licenses, letters, testimonials, titles, statutes, or documents which will be recognized by the board, under section 12 of the Dentists Act,—viz, Licentiate in Dental Surgery of the Royal College of Surgeons of England, Licentiate in Dental Surgery of the Royal College of Surgeons of Edinburgh, Licentiate in Dental Surgery of the Faculty of Physicians and Surgeons of Glasgow, Licentiate in Dental Surgery of the Royal College of Surgeons in Ireland, Licentiate in Dental Surgery of a University in Australia or other British possession, degree of Doctor of Dental Surgery or Doctor of Dental Medicine, conferred by a school which is either a member of the National Association of Dental Faculties of the United States of America or the diploma of which is recognized by the state dental board of the state under whose charter it works, the license or diploma of any other legally qualified dental school or dental board the certificate of which is granted after not less than three years' study or five years' practice

of dentistry and satisfactory examination in the following subjects,—viz, anatomy, physiology, histology, bacteriology, pathology, therapeutics, chemistry, metallurgy, materia medica, operative dentistry, prosthetic dentistry, hygiene, and orthodontia. It is further provided that the Dental Board shall from time to time hold, or cause to be held, examinations in theory and practice of persons being registered as dentists, and shall grant certificates to persons passing any such examination. The board shall admit to such examinations any person desiring to be examined who has previously paid a fee of £5 5s. and has satisfied the board that he is a person entitled to submit himself for examination, provided that a subsequent examination may be allowed on payment of a further fee of £3 3s., and on such conditions as the board may determine.—*Lancet*.

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler. A star (*) indicates a thesis.

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LIST OF UNITED STATES PATENTS PERTAINING OR APPLICABLE TO DENTISTRY ISSUED DURING OCTOBER, 1901.

- Oct. 1.—No. 683,500, to JOHN S. SAGER. Tooth-powder distributor.
 " "—No. 683,640, to HAROLD DEW. CROSS. Dental articulator.
 " "—No. 683,696, to LOUIS MAILLARD. Dental drill.
 " 15.—No. 35,182, design, to ARTHUR W. BROWNE. Dental engine angle hand-piece handle.
 " 22.—No. 684,841, to MONT. C. MERKER. Head rest for dental chairs.
 " "—No. 684,842, to MONT. C. MERKER. Elevating mechanism.
 " "—No. 684,843, to MONT. C. MERKER. Valve mechanism for hydraulic elevators.
 " "—No. 684,844, to MONT. C. MERKER. Dental chair.
 " "—No. 684,951, to WM. C. ROTHKRAZ. Attachment for dental tools.
 " "—No. 685,069, to JOS. E. VAN NOSTRAN. Combined motor and cuspidor.
 " 29.—No. 685,659, to GILBERT M. WILLIAMS. Dental implement.

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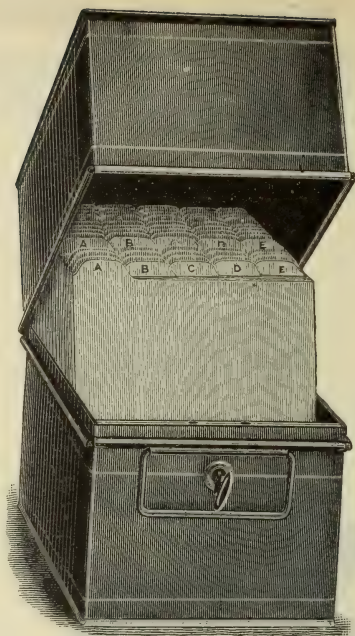
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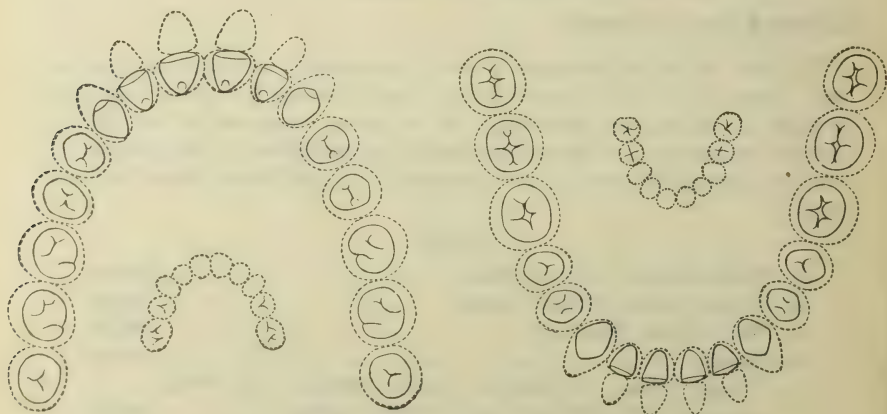
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As each operation is performed it is checked off on the blank, thus showing at a glance what work has been done and what remains to be done. At the close of the day the transaction is transferred to the Record Card.

When all of the work has been completed, the Record Card is removed from the first Guide (buff) and placed before its corresponding letter in the second Guide (salmon), it remains there until the account has been settled.

when it is again removed to the third Guide (blue). In this way the first guides (buff) will contain the record cards of those whose work is being done, but has not been finished. The second guides (salmon) will contain the cards of work completed, but not paid for, while the third (blue) will hold only cards showing settled accounts.

When bills are to be made out the cards in the second guides are removed and bills made from them. All bills should be entered on the (blue) Bill cards, and as the amounts are paid they should be checked off.

Bills

1901			REC'D	PAID
Jan	1	Albert J. J.	29	
"	1	Archer Co. J.	18 50	
"	1	Bergellius John O.	63	
"	1	Barker O. R.	39	
"	1	Benson Miss H.	22 50	
"	1	Clayton Mrs. R.	74 50	
"	1	Drewson L. B.	112	
"	1	Davidson L. H.	33	
"	1	Drewes B. J.	41	
"	1	Franklin, H. H.	59 50	

At the same time each payment should be entered on another of the (blue) Cash Account Cards, which will show the amount of cash received from time to time.

Cash

1901			REC'D	PAID
Jan	3	Archer Co. J.	18 50	
"	"	Davidson L. H.	33	
"	"	Barker O. R.	39	
"	"	Franklin H. H.	59 50	
"	"	Benson H.	22 50	
"	5	Clayton R.	74 50	
"	"	Albert J. J.	29	
"	"	Gunningham A. B.	49	
"	"	Rupert L. R.	63	
"	6	DuPont V. B.	92	

In this manner, any amount paid is shown, first by credit on Record card; second, on Cash Account card; and third, by being crossed off on Bill card. Each one acts as a check on the other, and errors of credit are almost impossible.

The system has the following important advantages:

First. The handling of cumbersome books is done away with.

Second. Cards of such patients as die or remove are thrown away and no dead accounts are carried.

Third. Ease of entering items; each card being taken out, item recorded, and then returned to its proper place.

Fourth. Facility in making out bills. All Record Cards between the salmon guides, and only those, call for the making of bills, the work having been completed.

Fifth. New accounts can be introduced and old ones discarded without disturbing the system.

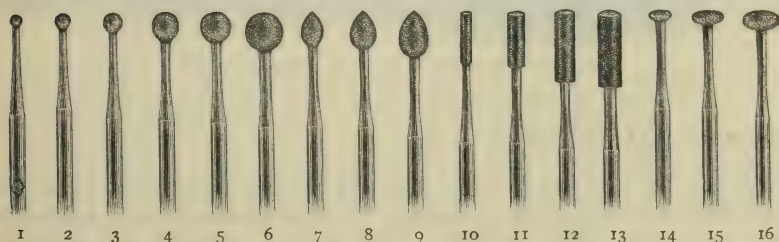
Sixth. Besides its convenience and systematic method, the cost of using the Card System is much less than the old one of buying new books from time to time.

The outfit consists of a japanned tin case (see illustration) fitted with lock and key, 300 Record Cards, 15 Cash or Bill Cards, with three sets of Guides and one pad of 100 Examination Blanks.

Price, Outfit No. 1, complete\$5.00

We are now preparing two outfits, Nos. 2 and 3, in quartered oak, but are not yet ready to put them on the market. Being anxious that the wood shall be carefully selected and seasoned, we make haste slowly in these matters to secure satisfactory results.

DIAMOND BURS.



In this line of Diamond Burs we place at the disposal of the dentist the wonderful cutting properties of the diamond in the small forms known as "burs." There are sixteen instruments, of which six are rounds, three bud-shaped, four square-end fissure, and three oval.

The grit is very fine. They will be found very useful, especially in finishing up the edges of cavities, leaving them smoother even than when the Arkansas stone point is used.

The points are made of soft steel in which the diamond is thoroughly incorporated. They should be run at high speed and kept well wet. Made for any of our hand-pieces.

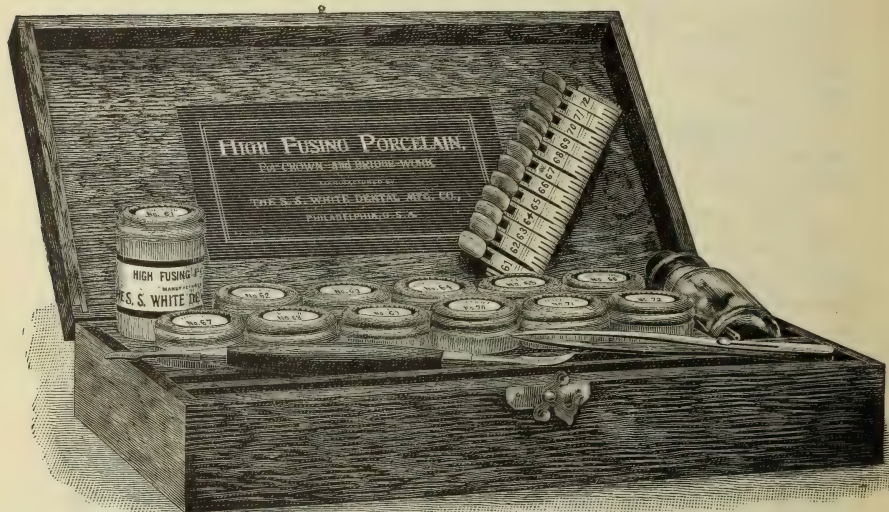
PRICES.

Nos. 1, 2, 3, 14	each	\$0.75
" 4, 7	"	1.00
" 5, 8, 10, 11, 15	"	1.25
" 6, 9, 12, 13, 16	"	1.75

High-Fusing Porcelain

FOR MAKING

Inlays, Crowns, and Bridges.



Outfit for Porcelain Crown- and Bridge-Work.

Porcelain Art Revived.

Within the past two or three years the making of porcelain inlays has received an impetus, largely through the intelligently directed researches and experiments of Dr. Jenkins and the practical results thereby achieved, which has carried it into the practice of many dentists. Coincident with this, and perhaps largely influenced by it, has been a notable revival of interest in the making of porcelain crowns by dentists for individual cases. The tests thus made of methods and materials and the experiences so gained seem to have settled pretty conclusively that high-fusing porcelain bodies only are adapted to secure satisfactory practical results,—that is, bodies which do not fuse till after the melting-point of gold has been passed.

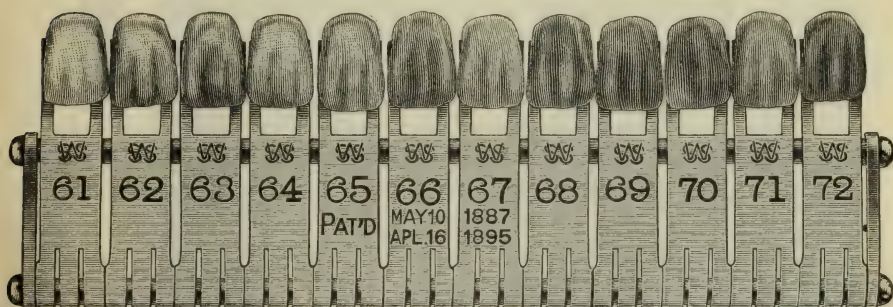
Why High-Fusing Bodies are Better.

We have felt almost from the beginning of the present agitation of the subject that the final verdict could not be otherwise than that just recorded. There are practical difficulties in manipulating low-fusing bodies which are not met with in the high-fusing. Thus, there is a tendency to assume a spherical form when fused which precludes the maintenance of the fine

lines of carving. It is also hard to keep to shades, as the heat burns out the color. Other common faults in low-fusing bodies are "sputtering" and a liability to crack. This latter sometimes takes place after the piece has apparently been successfully completed, a crack developing a day or two after it has been laid aside as all right.

Inlays and Crowns Differ.

It took a good deal of experimenting on our part to determine just how high-fusing the body should be. The fusing-point might be made so high that the practical working of the processes would be interfered with. One important fact which was developed was that the body which gave the best results for inlays did not give the most satisfactory performance when used for crowns. This necessitated the preparation of two lines of the powders. Both of these are fine ground, but they differ somewhat in



Standard Shade Guide, showing Colors of The S. S. White Dental Mfg. Co.'s High-Fusing Porcelain for Crown- and Bridge-Work.

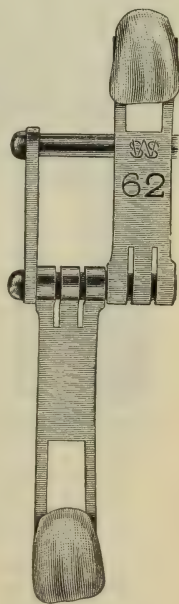
fineness and consequently in fusing-point. The coarser and higher fusing is for crowns, bridges, and dentures; the finer and lower fusing is for inlays. Both, however, are of the class known as high-fusing. The inlay bodies can be used very satisfactorily for crown-work, but the crown bodies do not work so well for inlays. Each has a minimum degree of shrinkage, is easily carved, and the product is strong and holds its shape in fusing.

Colors.

We have two outfits,—one for inlays and one for crowns, the only difference between them being in the character of the bodies, as just noted. Each outfit contains twelve jars of the various colored powders or bodies, including grays, browns, yellows, greens, blues, and pink gum color. Included also, as one of the twelve, is a jar of colorless or reducing body, for toning down or reducing the intensity of any one or more of the others, and for producing varieties of shade. One or two of the colors are purposely made intense, at the request of many users. A sample tooth made from each of the bodies is mounted on a small Shade Guide for purposes of matching.

Numbering the Colors.

The Crown- and Bridge-Work Colors are numbered from 61 to 72. The Inlay Colors are numbered from 81 to 92.



Combination of Colors.

We do not supply samples of combinations of the various colors, believing that the buyer can more usefully make them himself if desired. Nor do we give a list of formulas for combination, for the same reason. Every dentist who enters upon the making of porcelain inlays and crowns will want to do some experimenting in the mixing and fusing of colors before he essays practical work. If he will make a careful note of the exact proportions of the various colors used in each experiment and mark the result, he will have a set of samples which he knows all about, and to which he will work with greater satisfaction than to a set of cut-and-dried specimens. He will also have an invaluable record and every experiment will serve as a guide in his future practical work; the failures admonishing him what to avoid, the successes pointing the way to useful practical results.

Fusing Colors.

The colors are mixed with a "mixing fluid," with alcohol, or with water. Some mixing fluids contain a modicum of starch, which is objectionable, as the starch sometimes acts as a flux. A mix with alcohol dries out too quickly, owing to the rapid evaporation of the alcohol. So we prefer to mix with clean water, which gives every desirable quality without any undesirable features.

No Waste.

Mixing these colors with clean water and clean instruments on a clean glass or porcelain slab, as will naturally be done to assure good work, there need be no waste of the powders where single colors are used. If more powder has been mixed than is required for the operation, the residue can be returned to the jar from which it was taken without the slightest injury to the remainder.



Spring-Tempered
Tweezers "K."



Double End
Carving Tool.

Matrices and Fusing.

In making inlays with our high-fusing bodies a platinum matrix is a necessity. We supply a platinum foil, one one-thousandth of an inch in thickness, specially prepared for the purpose, and which can be ordered of the size required.

For fusing we recommend an electric furnace, where the electric current is accessible. It is noiseless, clean, and can be used with greater certainty of success by the inexperienced. Where the electric current cannot be had, either gas or gasoline furnaces can be used, but they require greater care.

The Outfits.

Besides the colors, each outfit contains a pipette bottle with ground-glass stopper, in which the exact quantity of the mixing fluid desired can be



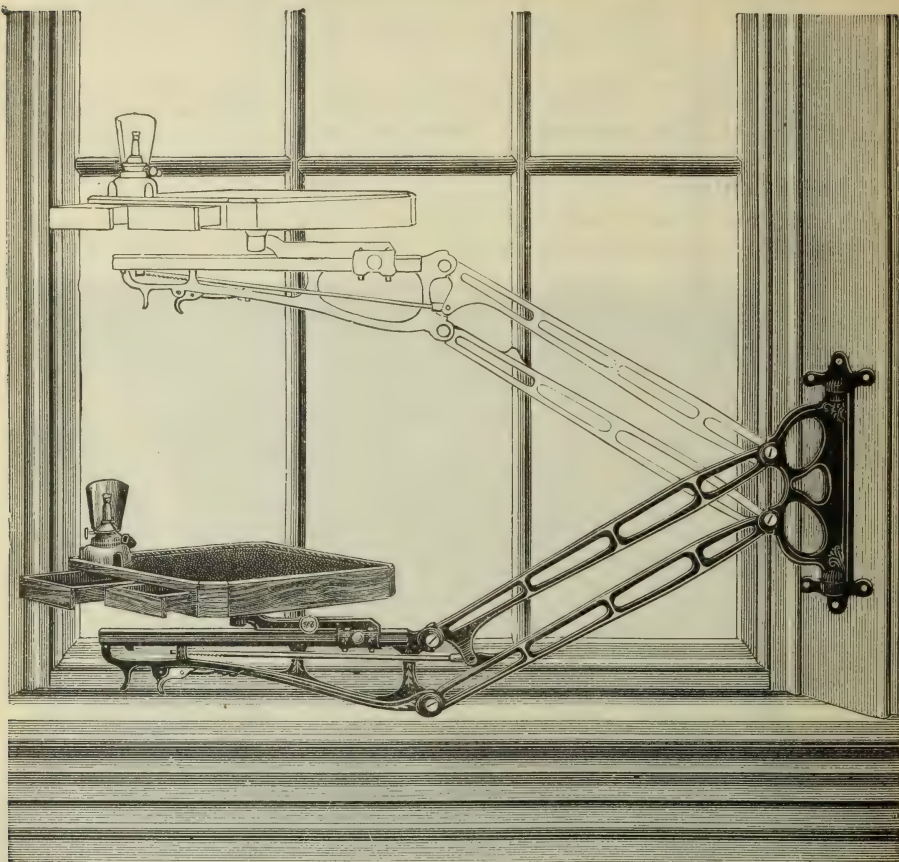
Outfit for Inlay Work.

taken up; a double-end carving tool something like one of the Evans patterns, but with the working ends of steel instead of ivory, with which any kind of carving may be done; a pair of spring-tempered tweezers, with a sliding lock-pin in a slot, for handling inlays or crowns, or for holding bands; and a No. 13 mixing spatula; the whole inclosed in a neat, well-made oak case with locking device.

PRICES.

High-fusing Porcelain Outfit for Crown- and Bridge-Work.....		\$10.00
Containing	12 Bottles, Bodies Nos. 61 to 72.....per bot.	\$0.50
	1 Double-End Carving Tool.....	1.00
	1 pair of Locking Tweezers, "K".....	.75
	1 Pipette Bottle.....	.25
	1 No. 13 Spatula.....	.25
	1 Shade Guide, Nos. 61 to 72.....	1.00
High-fusing Porcelain Outfit for Inlays.....		\$10.00
Containing	12 Bottles, Bodies Nos. 81 to 92.....per bot.	\$0.50
	1 Double-End Carving Tool.....	1.00
	1 pair of Locking Tweezers, "K".....	.75
	1 Pipette Bottle.....	.25
	1 No. 13 Spatula.....	.25
	1 Shade Guide, Nos. 81 to 92.....	1.00
Oak case not sold separately.		

THE S. S. WHITE TOOL-BRACKET No. 1.



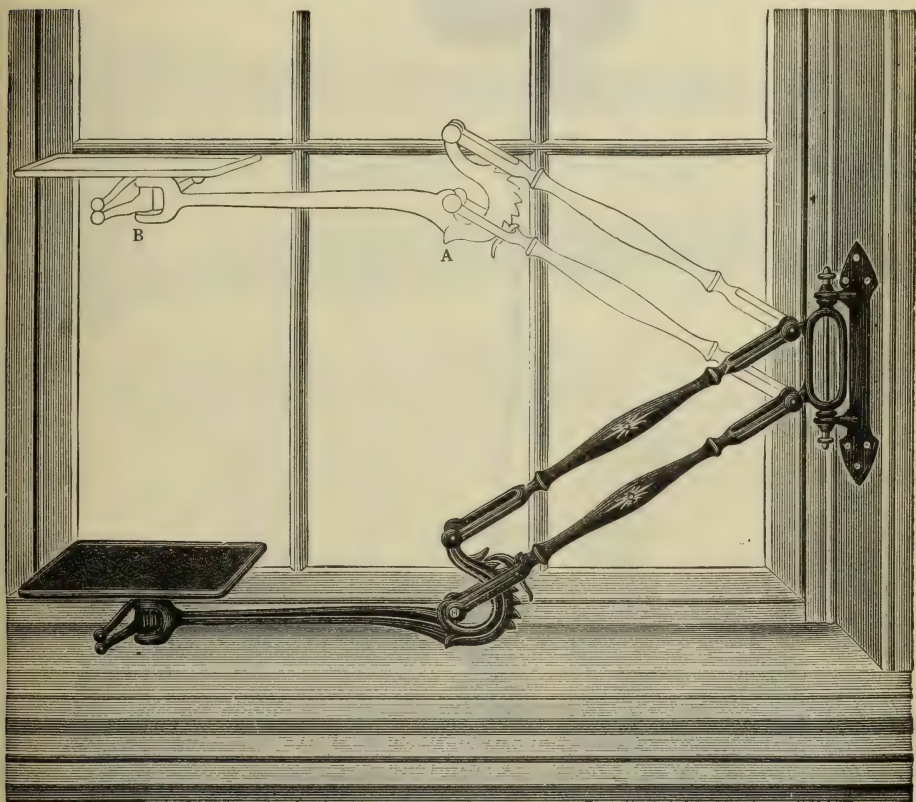
In this Bracket the tray has a horizontal adjustment of 15 inches, which, with the reach of the pivoted arms, permits it to be swung 45 inches from the wall. The cut shows the highest and lowest relative positions. It is raised by lifting to the desired height, an automatic lock holding it wherever placed. To lower it, grasp the handle near the end of the carrier-frame, and compress the trigger with the finger, when the table sinks to the required level; releasing the trigger locks it. Both movements are simple and require but one hand. The tray shown is the ordinary Imitation Rosewood Table.

PRICES.

Japanned, without Table.....	\$10.00
With Imitation Rosewood Table.....	16.00
“ Plain-Side Allan Table, Walnut or Oak.....	20.00
“ “ “ Mahogany	22.00
“ Glass-Side Allan Table, Walnut or Oak	22.00
“ “ “ Mahogany	24.00
“ Holmes Table, Walnut or Oak	40.00
“ “ “ Mahogany	43.00
Alcohol Lamp and Shield is included in the above prices.	
Boxing .....	.50

THE S. S. WHITE TOOL-BRACKET No. 2. WITH TABLE.

Patented September 18, 1894.



This Bracket and Table combines simplicity of construction and convenience in the highest degree. The cut shows the arrangement of its parts so clearly that but little description is needed. When fully extended it reaches 52 inches from the place of attachment. The variation in the height of the Table is 23 inches. By the adaptation of the parallel bars B, the horizontal extension may be shortened 15 inches. For this movement a slight push on the edge of the Table is all that is required.

When the arms B are in position at right angles with the Bracket, the Table may be made immovable by pressing the arms on both sides in the same direction, either forward or backward. To raise the Table, lift the Bracket, and the ratchet and trigger, A, acting automatically, will hold it at any desired height. The Bracket is japanned and ornamented in bronze.

The Table is made specially for this Bracket. A plain tray, 12 inches square, covered with leatherette, raised rim, no drawers. Won't warp.

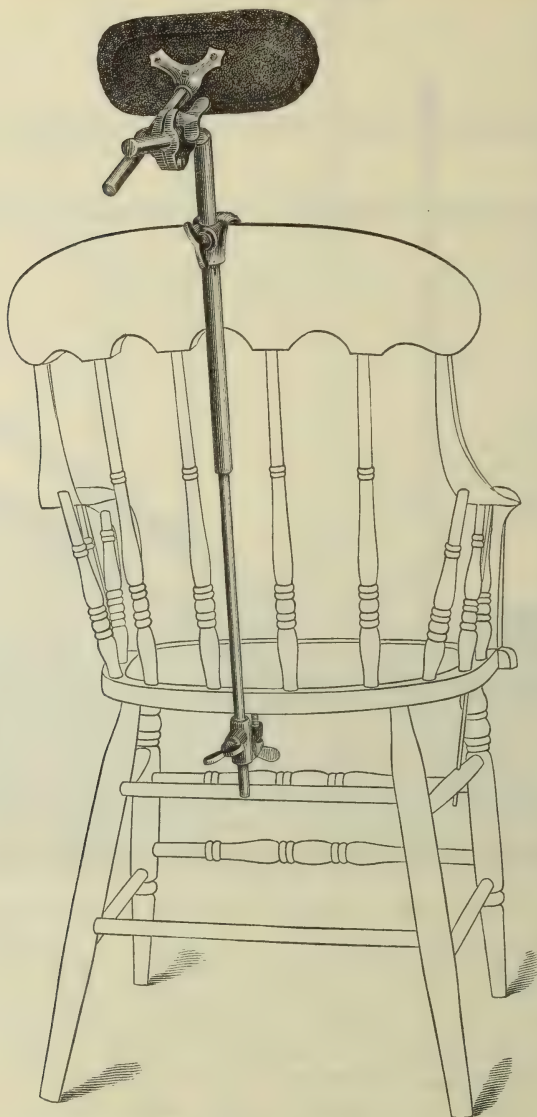
We do not hesitate to say that this is in every way the best and most convenient Bracket and Table ever offered at the price.

Price, complete as illustrated\$10.00

Boxing, \$0.50.

THE S. S. WHITE PORTABLE HEAD-REST (IMPROVED).

Patented March 10, 1885.



This Head-Rest has been improved by changing the form of the support, simplifying it by the omission of one of the clamps. It has free and full movement in all directions, and it may be adjusted with equal facility to suit a very tall man or a small child. It can be attached with ease to almost any style of chair. In the cut it is shown in position on an ordinary office-chair. It weighs but five and a quarter pounds, and when folded up and packed for transportation it occupies but little space, adapting it to the needs of the traveling practitioner.

It is substantially made and nicely finished; all the metal parts nickel-plated. The head-pad is upholstered in Maroon and Green Plush, in the best manner and with the best materials.

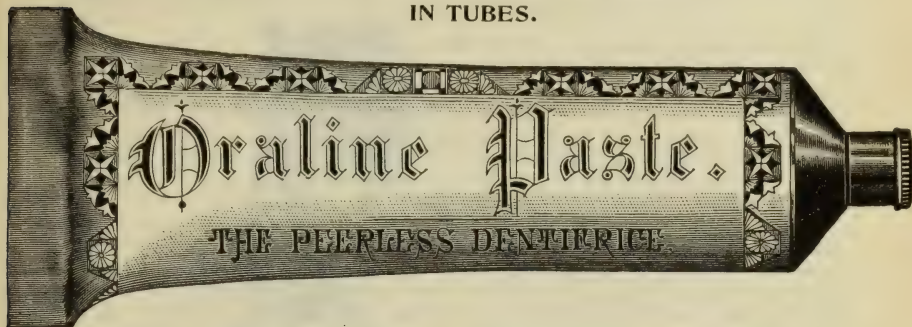
Price \$12.00

ORALINE PASTE.

(Registered Trade-Mark.)

Oraline Paste combines real efficiency as an abrasive, detergent, and antacid with elegance as a toilet article. It imparts a delightful and persistent fragrance to the breath and a sense of cleanliness to the mouth. In these respects it is superior to any other article we have tested.

IN TUBES.



Put up in tubes as shown in the cut, making it convenient for use; each tube inclosed in a neat box. In gross lots or more, the dentist can have his name and address printed on the labels without extra charge.

Price.....	per gross	\$25.50
".....	per half-gross	13.50
".....	per dozen	2.50
".....	each	.25

IN OPAL GLASS JARS.



Large.



Small.

For home use opal glass jars are perhaps preferable to tubes. We supply the Paste in two sizes of jars, known respectively as Large and Small, the former containing 2½ oz. and the latter 1½ oz. They are provided with screw caps having nicked rims, and handsome lithographed label in gold and colors.

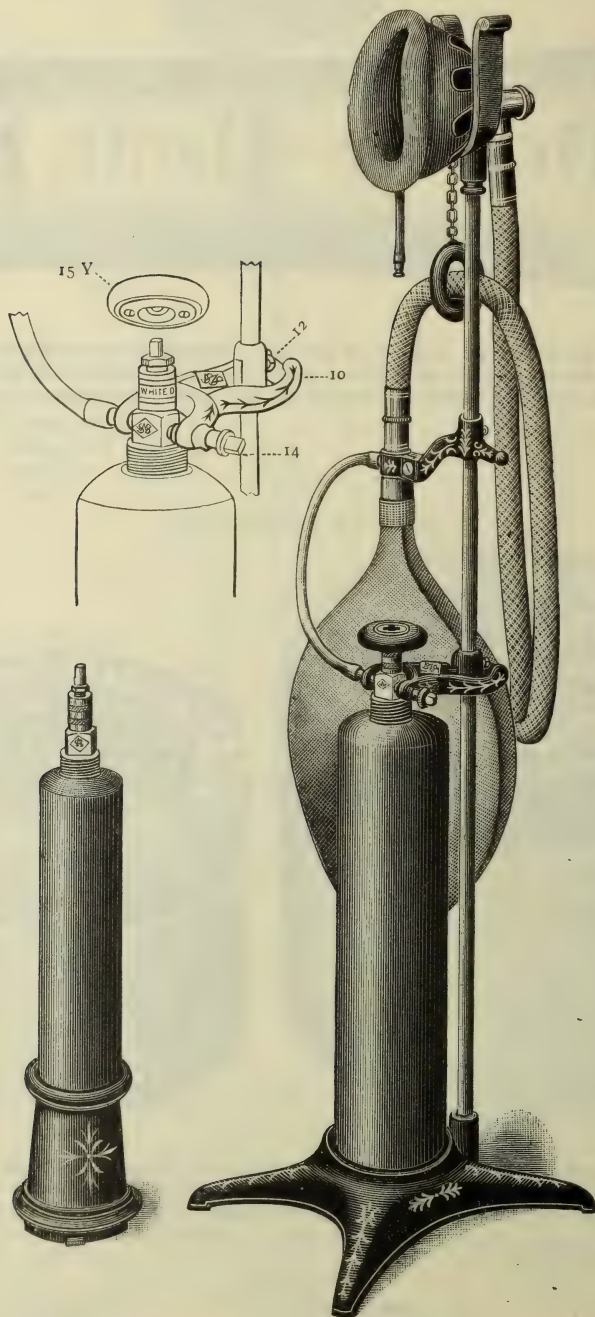
PRICES.

Large.....	per gross	\$40.80	Small.....	per gross	\$25.50
".....	per half-gross	21.50	".....	per half-gross	13.50
".....	per dozen	4.00	".....	per dozen	2.50
".....	each	.35	".....	each	.25

UNIVERSAL GAS STAND.

[SEE OPPOSITE PAGE.]

Patented March 22, 1898; May 15, 1900. D. R. G. M. No. 91,428.



UNIVERSAL GAS STAND.

[SEE OPPOSITE PAGE.]

This Universal Stand provides for the use of all three sizes of gas cylinders, Small or 100-gallon, Medium or 250-gallon, and Large or 450-gallon. This feature, with its convenience, compactness, and beauty, will commend it to the profession as the finest apparatus for the administration of nitrous oxid yet offered.

The base is of iron, with a coned socket for the reception of the cylinders. The upright carries a yoke connection for the valve of the cylinder, an arm for the support of the gas-bag, and a wood fork at the top for holding the inhaler when not in use. Attached to the fork by means of a chain is a wood ring for the support of the inhaler tubing. The base is heavy to assure solidity and firmness on the floor. The coned socket provides for Medium and Large Cylinders, the latter sitting in the upper part and the former passing down to the bottom. For the Small Cylinders a pedestal casting is provided which sits in the coned socket, with catches to hold it firmly to the base.

The yoke connection, 10, has a short up-and-down swing to accommodate itself to the cylinder neck. It is also adjustable upon the upright. Shown in position for the small and Medium Cylinders. For the Large Cylinders it can be raised by loosening the set-screw 12 (a countersunk spot will be found on the rod to receive the set-screw in the new position). The cylinder is held securely in the yoke by tightening the screw 14. Be sure there is a leather washer on the yoke nipple, to make a tight joint between the yoke connection and the cylinder. The wood wheel-key 15Y operates both the yoke screw 14 and the valve of the cylinder. A quarter turn releases the yoke screw.

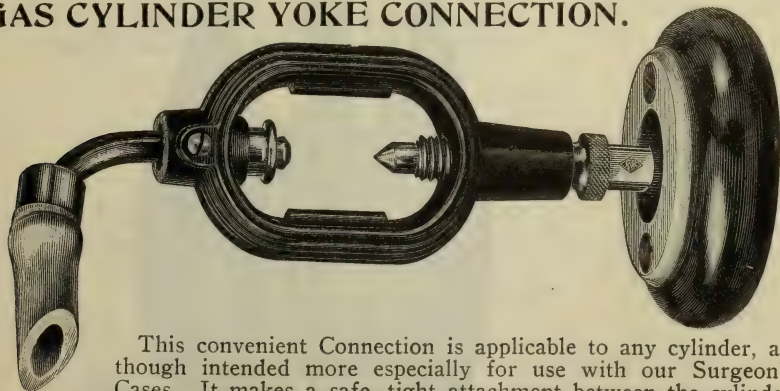
The entire appliance is of metal, except the fork, the ring for the inhaler tubing, and the wheel-key. Base, pedestal, yoke connection, and arm japanned black and ornamented. Other metal parts nickel-plated. It occupies a floor space 10 x 13 inches, and is 3 ft. 7 in. high to the top of the fork.

The complete apparatus includes also gas-bag with inhaling and supply tubing, a No. 3 Inhaler, and a cylinder of gas.

PRICES.

Universal Gas Stand, as shown in the illustration, less Gas Cylinder, with 4½-gallon Bag.....	\$23.25
The same, with 7-gallon Bag.....	24.00
Stand only, i.e., less Inhaler, Bag, and Tubing.....	12.00
Gas and Cylinder in addition.	

GAS CYLINDER YOKE CONNECTION.



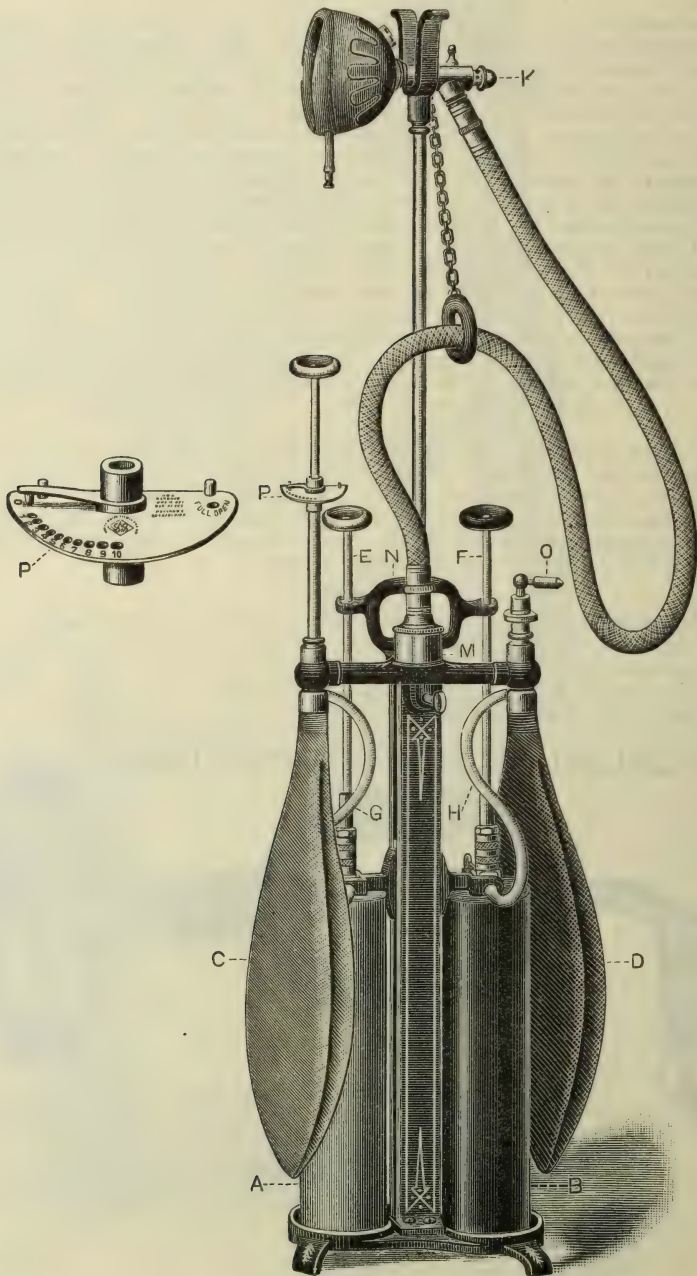
This convenient Connection is applicable to any cylinder, although intended more especially for use with our Surgeon's Cases. It makes a safe, tight attachment between the cylinder and the gas-bag. The metal tube for the hose leading to the gas-bag can be turned as desired and fixed securely with the set-screw seen at the left.

The connection is operated by the same wheel-key which opens the cylinder. Made of iron, neatly japanned.

Price, Yoke Connection	\$1.00
" Wheel-key, Polished Wood .....	.50
" Thimble, nickel-plated .....	.10

APPARATUS FOR ANESTHESIA BY NITROUS OXID AND OXYGEN COMBINED.

Patented October 13, 1885; December 13, 1887; February 14, 1888; March 22, 1898.
D. R. G. M. 91,428.



ANESTHESIA BY NITROUS OXID AND OXYGEN IN COMBINATION.

This apparatus for the exhibition of Nitrous Oxid combined with Oxygen for the induction of anesthesia by the "non-asphyxial method," is based on the ideas and apparatus of Mr. Frederic Hewitt, but we have made modifications which we believe add to its convenience and satisfactory working. It is to be remembered that the anesthesia is produced by the Nitrous Oxid alone, the office of the Oxygen being merely that of a modifier of the effects of the Nitrous Oxid. Thus, with a proper addition of pure Oxygen to the Nitrous Oxid as administered, there is claimed to be no danger of asphyxiation. Should the Nitrous Oxid alone be used with this apparatus there is always at hand the Oxygen, which the opening of a valve will admit at once to overcome any tendency to asphyxiation which may develop.

The method is in effect simply a scientific application of the principle on which most successful administrators of Nitrous Oxid work,—namely, the prompt admission of air on the observance of the first untoward signs. This apparatus supplies pure Oxygen instead, with all its advantages, and under the absolute control of the operator. It meets all the requirements for this purpose, or it can be used for giving either Nitrous Oxid or Oxygen separately.

Cylinder A contains Pure Oxygen.

Cylinder B is filled with Nitrous Oxid.

C and D are rubber bags of different colors to avoid confusion.

E and F are keys which open the valves of the cylinders and allow the gas to fill the bags through the tubes G and H.

The valves O and P being closed, the gas remains in the bags.

By opening O Nitrous Oxid is admitted to mixing chamber M, from which it flows through the covered rubber tube to the inhaler.

When it is desired to combine Pure Oxygen with the Nitrous Oxid, open valve P, which admits the Oxygen to the mixing chamber, whence the mixed gases flow to the inhaler.

The valve P, with its gauge plate, is especially designed to enable the operator to follow Dr. Hewitt's method, the valve-opening enlarging regularly as the handle is turned. It must be understood, however, that exact and predetermined percentages are neither practical nor desirable. (See enlarged side view.)

N is a convenient handle by which the apparatus, which balances nicely, may be carried.

For compactness in transportation the rod which supports the inhaler may be run down to the level of the mixing chamber.

The Cylinder for Oxygen is always red.

The Cylinder for Nitrous Oxid is black.

PRICES.

Two-Cylinder Outfit.

N ₂ O and O Apparatus, less Cylinders	\$50.00
Complete with two small Cylinders containing respectively 100 gals. N ₂ O and 40 gals. Oxygen, 4 ft. silk-covered tubing, two (2) two-gallon Gas Bags, and No. 3 Inhaler with in- flatable face-piece	66.00
Complete as above with two Medium Cylinders filled with N ₂ O and O, respectively	78.75

Three-Cylinder Outfit

N ₂ O and O Apparatus, less Cylinders	\$60.00
Complete with three small Cylinders, two containing 100 gals. each of N ₂ O and the third 40 gals. of Oxygen, 4 ft. silk- covered tubing, two (2) two-gallon Gas Bags, and No. 3 Inhaler with inflatable face-piece	84.00
Complete as above with three Medium Cylinders, two filled with N ₂ O and the third with Oxygen.....	103.75

Those who have the two Cylinder Apparatus can have the base altered to take three Cylinders at a cost of \$10; the extra Cylinder required would, of course, be charged for at our regular price.

“Perfection” Carborundum Strips.



“Perfection” Carborundum Strips afford all the advantages of the unequaled “Perfection” Cloth and Carborundum combined. This particular combination means the best grade of cloth known for strip purposes charged with Carborundum powder in the most skillful manner. The “Perfection” Carborundum Strips are thin, they are tough, they are lasting, they resist wear,—the cloth does not fray or lose its grip on the powder. They are the best Carborundum Strips made at any price, and their price is very low.

Made in three grits: Fine, 220; medium, 180; coarse, 120.

Put up in one-gross boxes, each grit separate, or assorted.

Price.....per gross \$0.30

“PERFECTION” STRIPS.

“Perfection” Strips fill the needs better than any other make. The cloth of which they are made is extremely thin and exceedingly tough. They can readily be insinuated into the narrow spaces they have to enter, and they are strong to resist the strain to which they are exposed in use. They are charged with the polishing powder carefully and skillfully, so that it is distributed evenly over the surface of the cloth, and adheres firmly to it. They are durable, will stand wear, and give satisfaction,—in a word, they are the best Polishing Strips at the service of the dentist.

The regular line of Perfection Polishing Strips comprises the following varieties:

**Emery,
French Emery,
Garnet,**

**Flint,
Lava,**

**Pumice,
Rouge.**

Put up in one-gross boxes, each kind separate, or assorted.

Price.....per gross \$0.30

LINEN CLOTH STRIPS.

Very thin, very strong. 1 gross in a box.

Price.....per box \$0.30



ONE EIGHTH OUNCE

GOLD FOIL

THE S.S. WHITE DENTAL MANUFACTURING CO.

№ 4 COHESIVE

[FAC-SIMILE OF LABEL ON ENVELOPES.]

WORKING QUALITIES UNEQUALED.

The principal factor in the success with which our standardized Gold Foil has met is accounted for by its unequalled working qualities. It is so extremely soft under the instrument. That is where the superiority of our treatment is manifest. The softness is not injected into the gold; it is there originally, a native quality of the gold. Oftentimes in preparing it for the dentist's uses a portion of this quality is lost, the gold as sold is not so soft as it might be and ought to be. By our processes the softness is so maintained that the lead-like quality of the Foil in the manipulative processes of the dentist is a frequent subject of comment among those who use it.

A PURE GOLD.

This foil is made from pure gold,—that is, gold refined and rerefined till the most delicate tests fail to reveal the presence of any impurity. Then, and not till then, is the gold fit, in our eyes, to go through the processes which end in the finished Foil as sold to our patrons. It may not be absolutely pure,—absolute is a strong term,—but it is so near an approach to that state that we are justified in calling it pure. Government mint bars are reckoned pure when they may contain as much as 0.003 impurity. They are not near our standard of purity. We take them and remove the impurity before we call them pure. Then, in the processes to which the gold is subjected, every precaution known to human skill and foresight is taken to prevent contamination. We know, by tests, and any dentist can know for himself, that the purity is preserved.

AS A FILLING MATERIAL.

With the purity of the product assured, there can be no question as to the fillings made of this Foil. The ease with which it is manipulated, owing to its softness, enables the dentist to put it just where he wishes it to go, to manipulate it and form it as he needs to. When the Cohesive variety is used, he has the advantage of the highest state of the natural cohesiveness of the metal, and the result is a filling homogeneous and dense all through. With the Non-Cohesive variety, the adaptation is so perfect that we again have the highest type of filling possible with "Soft" gold. (We of course suppose that the operator does his part without fault. No material can correct bad workmanship.)

AN ADVANCE.

Our Gold Foil (often referred to as "standardized") is, we believe, distinctly better than any other. It has qualities which make it stand out from and above other preparations. The price at which it is sold is another inducement to its use. Every part of every sheet is usable.

Price.....per $\frac{1}{8}$ oz. \$3.50
".....per oz. 27.00

TRADE
MOSS FIBRE GOLD.

MARK.
Registered No. 32,539.



A bit of Moss Fibre Gold magnified 100 diameters.

The Adaptability of Pure Gold.

What makes gold the standard material for filling teeth? Pure gold is soft, it is cohesive,—weldable,—it is malleable, it is ductile, it is condensable. The combination of these properties gives it adaptability, whereby it may be packed in a matrix to the form of the matrix. Pure gold also, when once adapted to a form, does not shrink, and, unless subjected to exceptional conditions, does not disintegrate or change its shape, but maintains the size and form to which it has been fashioned. The enumeration of its qualities shows why gold has been the standard material for filling teeth ever since its introduction for the purpose. No combination of gold with other metals so completely meets the needs as pure gold.

Moss Fibre a Pure Gold.

Moss Fibre Gold is a pure gold. By “pure” we mean so refined that the most delicate tests fail to reveal a trace of dross or alloy. The treatment of this pure gold which results in Moss Fibre is the outcome of long study and many careful experiments. It is a special process, every step of which is carried out on exact lines. As an example, a slight variation from the ascertained conditions of manufacture would affect the product injuriously,—making it something else besides the Moss Fibre Gold which we sell. The treatment conserves the inherent qualities of the gold which make it valuable to the dentist, so that Moss Fibre presents these qualities in a more highly specialized degree than other forms.

Where Moss Fibre Gold Leads.

Moss Fibre Gold is superior in

Its form.

Its economy.

Its softness.

Its adaptability.

Its cohesiveness.

Its beautiful finish and hardness of surface when condensed.

Form.

Moss Fibre Gold is in the form of a moss-like mass, with fibers interlacing, as seen in the illustration. This shows the appearance of a bit of the mass, less than one-sixteenth of an inch long, torn off as for filling purposes and magnified one hundred diameters. The long fibers,—the longest of any form of gold,—the character of the fibers,—each of an even thick-

ness throughout its length,—with their interlacing, afford the ideal conditions for easy condensation into a compact, homogeneous mass.

Economy of Moss Fibre.

There is a minimum of waste in the use of Moss Fibre Gold. It is a modification of crystal gold, but instead of short angular crystals we have the long fiber. There is consequently an absence of the brittleness or crumbliness characteristic of the true crystal forms, and of the tendency to mash up into powder when dried out. Nor does the Moss Fibre Gold break up, drop off the instrument on to the clothes of the patient as it is carried from the annealing tray to the cavity, but clings together as a mass. Even if accidentally dropped, it does not fall apart, and it is readily picked up again with the instrument or pliers. The explanation of this characteristic is made clear by an inspection of the illustration.

Softness.

Moss Fibre Gold is peculiarly soft under the instrument,—works almost like putty. In fact, it works so easily and the cavity is filled so rapidly that one may grow careless, thinking a filling fully condensed when it is not. It requires just the same care and nicety in its adaptation and condensing as foil, and no more. Each small fragment should be thoroughly condensed and welded to what has preceded it, before another piece is introduced. Its marked softness needs to be studied a little; one must know its peculiarities to get the best results with it.

Cohesiveness.

The cohesiveness of Moss Fibre Gold, when fully developed by annealing, is believed to be the maximum of which gold is capable. That is, it can be perfectly welded cold. The annealing should be done over a mica plate or similar fender, or preferably on an electric annealer, and care should be taken that no part of the gold comes in direct contact with a naked flame. Otherwise the edges will be fused, and harshness in working result. Moss Fibre Gold should always be slightly annealed or warmed before using, as like other sponge golds it absorbs moisture and gases if exposed to the atmosphere, which would interfere with the cohesion of the particles unless removed.

Adaptability.

The adaptability of Moss Fibre Gold—the facility with which it can be conformed to the cavity—is so great that retaining pits are not necessary, and but little undercutting is desirable. The paramount softness of the gold and its peculiar long and attenuated fiber are large factors in this superior adaptability. A floor for the cavity as near flat as may be, to prevent rocking of the filling while being placed, and a slight retaining shape only are necessary. With these provided, a perfect fit of the cavity walls may be made with this gold, its retention assured, and leakage provided against. In its adaptability—its capacity for a perfect fit—Moss Fibre Gold is unequalled.

Density and Hardness of Surface.

The cohesiveness of Moss Fibre Gold and its characteristic interlacing fibers lend themselves to perfect condensation, so that the filling when properly put in is one dense, homogeneous mass of gold, with a hard, tough, waxy surface, as resistant to attrition as gold can be made. It can be polished if desired, but most dentists will prefer the natural luster of the gold.

To Sum Up.

The characteristics of Moss Fibre Gold described make it easily the best gold at the service of the dentist. With its characteristics thoroughly understood and its requirements humored, a cavity can be filled faster with it than with any other form, and the filling will be at least as permanent. There is no sort of a tooth cavity in which it cannot be used, and it can besides be used in many cavities where other forms cannot. Its easy working qualities adapt it to every need.

Its Uses.

Moss Fibre Gold may be used for the entire filling or for merely starting it, or for the major part, finishing with foil. It makes a perfect filling when properly manipulated, with a surface as durable as any other gold. Where it is desired to use another gold—as foil—with it the two will combine well. Moss Fibre Gold can be packed by hand pressure or with the mallet,—hand, electric, or engine.

Dress.

This gold is so soft and easily condensed that to avoid injury through handling it is put up in a single layer in a stiff box. There are no cut edges, and should be none,—each piece as used is pulled or torn from the mass. Condensation into wire edges is thus avoided.

Instruments.

Pluggers having oval or spherical faces with fine, shallow, clean-cut serrations, such as are found in the Knowles, Royce, and Moss Fibre Gold sets are indispensable to the successful handling of Moss Fibre Gold.

Price.

From what has here been said it will be seen that Moss Fibre Gold is no ordinary product. It is expensive to make, and the price is somewhat higher than foil in consequence. But it has qualities which make it cheaper at its price than other mat or fibre gold.

Price.....	per 1/8 oz.	\$4.25
“	“ 1/2 oz.	16.50
“	oz.	33.00

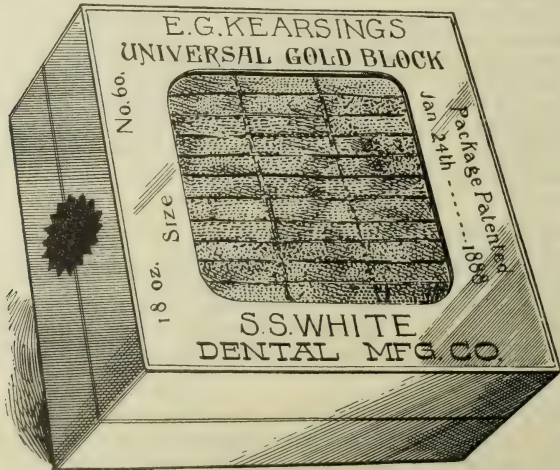
Test.

To enable those who are unfamiliar with Moss Fibre Gold to test its qualities at a nominal cost, we have had a quantity put up in small boxes containing twelve grains each.

Price, sample box, twelve grains	\$1.00
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Kearsing's Universal Gold Blocks.

Made of No. 60 Foil.



Sizes 1, 2, 3, 4, separately. Also, in boxes containing sizes 1 and 2 assorted; sizes 2 and 3 assorted; sizes 3 and 4 assorted; sizes 1, 2, 3, 4, assorted.

PRICES.

1/8 ounce	\$4.00	1/2 ounce or over....per oz.	\$30.00
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Pack's Gold Cylinders.



TWO VARIETIES:

SOFT CRYSTAL LOOSE-ROLLED CYLINDERS.

***SEMI-COHESIVE CRYSTAL LOOSE-ROLLED CYLINDERS.**



Each of these varieties is put up in $\frac{1}{8}$ -oz. boxes (Nos. $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, 2, 3, and Assorted) in a manner calculated to preserve the Gold unimpaired for any length of time.

PRICES.

$\frac{1}{8}$ ounce	.....	\$4.00
$\frac{1}{2}$ "	.....	15.00
1	.....	29.00
2 ounces at one time	.....	per ounce 28.00
5 " " "	.....	" 27.50

*This variety is made of a medium Cohesive Gold, very loosely rolled. The gold is so finely tempered that after annealing it retains the softness which is considered so desirable by some operators.

LOOSENING TEETH, OR CHRONIC ALVEOLITIS.

(Pyorrhea Alveolaris, Phagedenic Pericementitis, Riggs's Disease, Etc.)

ITS CAUSES, CLINICAL HISTORY, AND TREATMENT,

WITH

General Directions for the Care of the Teeth.

By **DR. HENRY S. NASH**, New York.

Perhaps no man has ever given more time to the study of pyorrhea alveolaris, or chronic alveolitis, as he preferred to call it, than Dr. Nash. For thirty-odd years he was what might properly be called a specialist in the treatment of this condition, a branch of practice in which he achieved marked success. The volume here offered is a record of his observations and conclusions with regard to the disorder, told in an interesting way. An untiring searcher into the phenomena of this protean disease and their causes, his work cannot fail to be useful.

A careful, critical review of the book says, "It is a notable and valuable contribution to the literature of the subject, and a work which no student of dental pathology should fail to read."

Small 8vo. Cloth. 316 pages.

Price \$3.00 net.

TO THE DENTAL PROFESSION.

As the result of twenty-five years' systematic laboratory and clinical experimentation upon the plastic material for filling teeth, I think I have reached the limit of possible excellence in connection with each, and have decided to withdraw from the individual sale of them, and I have offered to supply The S. S. White Dental Manufacturing Company, as "Sole Agent," with the specialties of Contour, Sub-Marine, and Facing Alloys, Hand-made Gutta-percha Stopping, and Oxychlorid of Zinc, to sell at the following retail prices:



PRICES.

Contour Alloy. .per oz.	\$3.00
Sub-Marine Alloy "	2.50
Facing Alloy "	2.50
Gutta-percha Stopping,	
per pkg. of $\frac{1}{3}$ oz.	1.00
Oxychlorid of Zinc,	
per pkg. of $\frac{1}{2}$ oz.	1.00



It will be observed that these prices are almost a return to my old list, the only difference being that Contour Alloy, which was \$3.50 per ounce, is now \$3 per ounce. My late reductions proved impracticable, and finding my time occupied with other duties, I could not give proper attention to such details as packing, bookkeeping, correspondence, etc., and hence desired to again place my products with The S. S. White Dental Manufacturing Company, making said company my "Sole Agent."

For all these materials, I would say that they are each the only one of its class that tests "Excellent" by such practical laboratory and clinical tests as have been demonstrated of value by many years of observation.

I have discontinued the making of "Zinc Phosphate" because I was unable to make a result which would test any better than a number of others now on the market.

Of all my work on alloys, that pertaining to "Contour" has been decidedly the most extensive, and it has resulted in a material which makes an amalgam for usual work that is by far the best of its class. To its ample strength, its desirable prompt setting, its ease of manipulation, its non-shrinkage, its capability of exceedingly high polish, it adds maintenance of color at least twice greater than any other dental amalgam made. In the most severe test,—that of 60 grains of sulphuret of potassium to 1 oz. of water,—it will maintain its color from 60 to 80 hours as against all others, the best of which discolors in from 30 to 48 hours.

In addition to this, I feel warranted in saying that it is absolutely free from that corrosive disintegration which pertains to all amalgams that contain both copper and zinc, whether as such or as compound metals, which is readily demonstrated in even so short a time as a three months' immersion in a sulphide solution.

It is upon this basis that I regard "Contour" Alloy as the only truly "first-class" amalgam alloy for usual work ever offered to dentists.

(Signed) J. FOSTER FLAGG,

TRUE DENTALLOY.



A Better Form of Package.

The collapsible tubes in which True Dentalloy was formerly sold developed one or two objections. If too much of the powder—True Dentalloy is in the form of powder, not filings or shavings—were taken out, it was difficult to return it. So we have adopted a neat bottle, with screw-cap. This affords all the advantages of the tube, without its disadvantages. It keeps the powder secure from the air, it permits any quantity to be taken out, and any excess is easily returned. The bottle is inclosed in a box.

As to the Alloy Itself.

It is made of pure metals,—and by “pure metals” we mean, not commercially pure, but pure according to the highest standard of scientific accuracy. It is manufactured after Dr. Black’s method, which means accurately. It is fine-cut,—powdery,—to favor ready and complete amalgamation. It has a definite combining proportion with mercury, and so combined it makes an amalgam which gives a strong breaking, crushing, and “flow” test; which is white in color, and uniform; which does not contract in setting, but expands slightly during the early stages and thereafter maintains its form and size. It is properly annealed and retains its properties indefinitely. True Dentalloy is at least equal to any other in the characteristics which assure usefulness to the dentist.

Price, in any quantity.....per oz. \$1.50

“THE OLD RELIABLE.”

Lawrence's



Amalgam.

Who first named Lawrence's Amalgam "The Old Reliable" is probably lost in the mists of antiquity. Whoever it was recognized the characteristic which made the reputation of this Amalgam—its capability of being made into fillings which could be relied upon.

Lawrence's Amalgam is always put up in a white lithographed envelope, covering a brown one containing the Amalgam, with Trade-Mark on the lap of each, and both copyrighted. Put up in $\frac{1}{3}$ oz., $\frac{1}{2}$ oz., and 1 oz. envelopes.

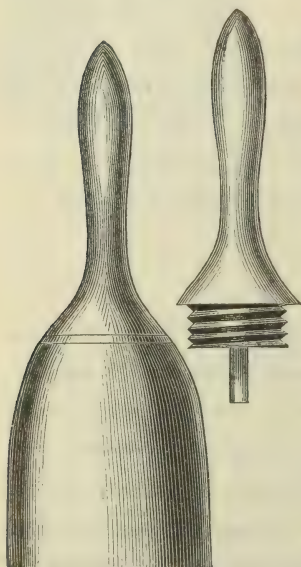
PRICES.

1 ounce...\$3.00 2 ounces...\$5.50 4 ounces...\$10.00 10 ounces...\$20.00

The S. S. White Dental Manufacturing Co., Sole Agent.

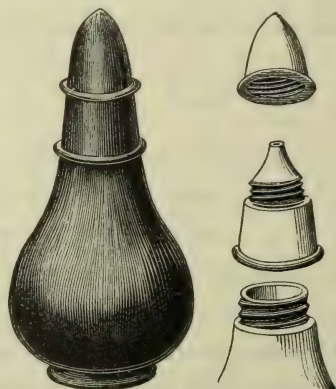
Mercury Holders.

NO. 1.



No. 2. Made of ebony or boxwood. It has two apertures, one for filling the holder, the other (passing through the center section) for permitting the escape of the mercury. The cap effectually closes the small opening.

NO. 2.



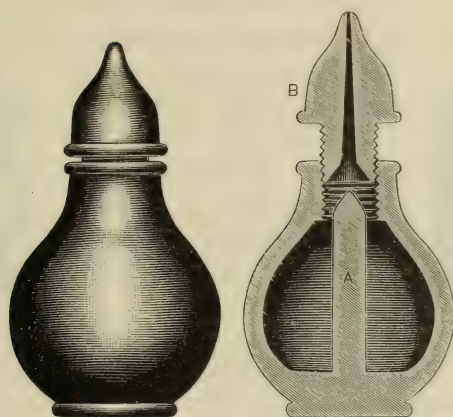
No. 1. Made of hard wood. A small opening through the tube allows the mercury to escape in a very fine stream. A plug at the lower end of the tube prevents its escape when not in use.

PRICES.

No. 1, empty.....\$0.25; filled with 2 ounces Mercury.....\$0.50
 " 2, "50; " " 2 " "75

MERCURY HOLDER No. 3.

Patented July 18, 1899; D. R. G. M. No. 116,851.



The "perversity of inanimate things" is aptly illustrated by the persistence with which mercury will escape from the ordinary Holder. You fill up the Mercury Holder, and then when you want to make an amalgam mix, there is no mercury in it. Somebody has mayhap tipped over the Holder, and the mercury has silently disappeared.

Our Mercury Holder No. 3 is supplied with a device to prevent this, so constructed that the mere turn of the screw-cap closes the Holder tightly. The cap B, which screws into the neck, is perforated, the bore tapering to the nozzle. At the inner end of the cap, the bore is flared, forming a sort of a funnel and also a seat for the coned end of a post A, extending from the center of the bottom of the Holder, a short distance into the neck. The working of the screw-cap upon the coned end of the post forms a valve, which when closed will effectively prevent the accidental loss of mercury. The form of the valve gives easy control of the flow of the mercury. A slight turn of the cap to the left opens the valve and allows the mercury to discharge; to the right closes it.

Made in boxwood and ebonized wood.

Price, either style.....\$0.50

Mercury.



¼ Pound in Bottle.

We sell the best re-distilled mercury only, specially prepared by a thoroughly responsible manufacturing chemist. Put up in quarter-pound bottles or holders, each bearing our trade-mark and labeled. For safety in transportation we place each bottle in a turned wood box, sufficiently secured to prevent damage to other goods.



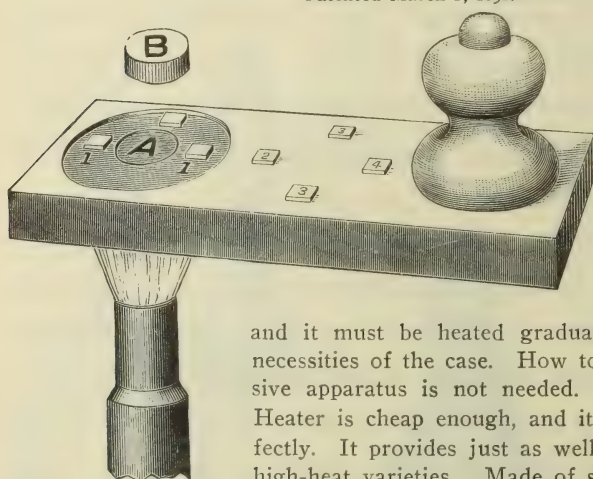
¼ Pound in Wood Holder.

PRICES.

Per bottle	\$0.50
¼-pound in Holder .....	.50

Dr. HOW'S THERMOSCOPIC HEATER.

Patented March 1, 1892.



A necessity to good results with Gutta-Percha is the proper heating of the material. It must be heated to just its softening point; not any more, not any less. It must be heated all through alike,

and it must be heated gradually. These are the necessities of the case. How to get them? Expensive apparatus is not needed. The Thermoscopic Heater is cheap enough, and it does the work perfectly. It provides just as well for low-heat as for high-heat varieties. Made of steatite, with a wood

handle and fusible buttons, A for low-heat, and B for high-heat Gutta-Perchas. A held over the flame melts at 212° F.; B at 230° F. Pellets of "Premium" Gutta-Percha placed at 1, 1, will be softened properly when the button A melts. The Heater can then be set on the bracket-table. Low-heat Gutta-Perchas can be placed at 2, 3, and 4, according to their softening points. For "Excelsior" Gutta-Percha the A button is poured out, and the B substituted.

The idea in the Thermoscopic Heater is that the Gutta-Percha shall be heated gradually and thoroughly without scorching, and that the operator shall have a perfect gauge as to the degree of heat used.

Price	\$0.30
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GUTTA=PERCHA STOPPINGS.

Meeting the Needs.

With the three Gutta-Percha Stoppings advertised here we believe we meet all the needs of the dental office for this form of filling-material. All of them are well known, as witness:

"Excelsior" Gutta-Percha—High-heat.

"Premium" Gutta-Percha—Medium-heat.

Temporary Stopping—Low-heat.

The two first named are put up in sticks and pellets, the last in sticks only. None of them is now supplied in the old "cake" form.

Their Uses.

High-heat and Medium-heat Gutta-Perchas are for permanent work because of their lasting qualities. As to which is to be used preferably in a particular case, that is a matter to be decided by the individual taste of the operator. Either will probably answer the purpose of a reliable filling, as Gutta-Percha fillings go.

Low-heat Gutta-Perchas are for temporary work, as the sealing in of medicaments or the temporary stopping of a cavity while the fitness of the tooth for permanent filling is in abeyance.

"EXCELSIOR" Gutta-Percha.

"Excelsior" Gutta-Percha, our High-heat variety, is well known to dentists, having been largely used by them for years. It softens at 225° F., is very dense, stands wear well, even when exposed to considerable attrition, and really comes near to being a permanent filling-material.

Put up in sticks and pellets, in ¼-oz. and ½-oz. packages.

Priceper oz. \$1.00

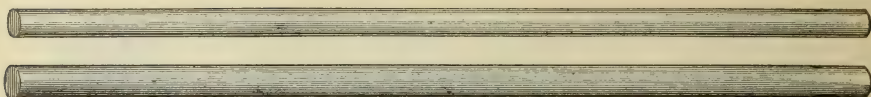
"PREMIUM" Gutta-Percha.

A very old variety, first put before the profession thirty years or more ago. A Medium-heat Gutta-Percha; softens at 208° F. Excellent for the interior of cavities, more especially those which approach the pulp closely. Has found extensive use in such cases under gold fillings. Good also for the entire filling where the surface is exposed to little wear.

Put up in sticks and pellets, in ¼-oz. and ½-oz. packages.

Priceper oz. \$1.00

THE S. S. WHITE TEMPORARY STOPPING.



A temporary stopping is a daily need in the dental office. It ought to render the highest service possible to its kind. Its uses are important. It must do its work well, or it is an utter abomination.

Suppose a medicament, as arsenous acid, is sealed in a pulp-chamber to devitalize the pulp. If the seal leaks, every dentist knows the damage possible to be done by the liberated poison.

So it is necessary in selecting a dressing seal to get the best, to get one which is dependable.

These are the qualities which you will find in The S. S. White Dental Mfg. Co.'s Temporary Stopping. (Bear that name in mind—there is but one Temporary Stopping for which this house is responsible, and that is the one whose label distinctly states that it is manufactured by the Company.)

It softens sufficiently at a low temperature to be worked without much pressure and without inconvenience to the patient.

It has stickiness enough to adhere slightly to the cavity wall.

It does not contract after it is placed.

It will keep in good form as long as a temporary stopping ought to be in place,—weeks if necessary,—and it is easy of removal after its work is done.

It is an excellent trial filling for root-canals which have been affected by abscess, while testing their safety for permanent stopping; but it is in no sense a permanent filling-material.

It is used by softening with dry heat and packing quickly with wet or oiled instruments.

Made in sticks, pink and white, two diameters as shown, and put up in boxes, either all white or all pink, or both colors.

Priceper box \$0.30

Hill's Stopping.



BEWARE OF COUNTERFEITS!
The genuine is sold (in any quantity) in Sealed Packages only, bearing the above TRADE-MARK.

Made in U. S. A.

Hill's Stopping is always the same. Probably no composition filling was ever made with less variation in quality. It has been longer before the profession than any other gutta-percha preparation for filling teeth. From about 1855 on it has made and held its reputation. Other excellent gutta-percha preparations have come up and made their place in the world, but they have not lessened the esteem felt by many operators for Hill's Stopping, which still has a large sale.

Put up in half-ounce, quarter-ounce, one-tenth ounce, and one-twentieth ounce boxes.

PRICE.

Per ounce\$5.00

TEMPORARY GUTTA-PERCHA CAP-CROWNS.

Suggested by DR. T. M. HUNTER.

FIG. 1.

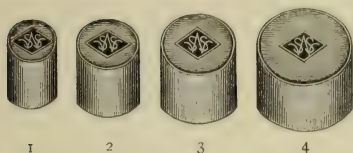
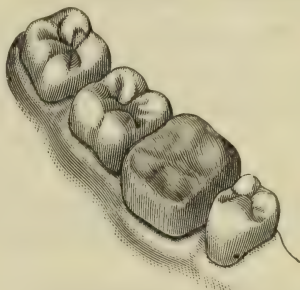


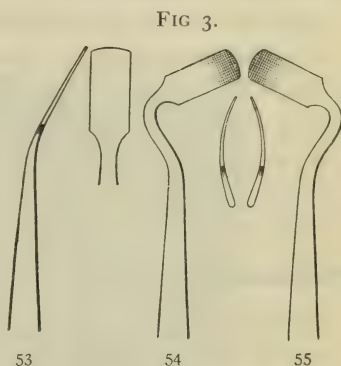
FIG. 2.



For the protection of teeth prepared for crowning against agencies which would irritate them and make their sensitiveness unbearable. The gutta-percha surface is soothing, and the Cap-Crown perfectly fends off cold draughts of air, acids, etc. These Cap-Crowns also afford an unequalled means of retaining medicaments in treatment or devitalization, especially in coronal exposures or in abrasion. Fig. 2 shows a cap in place on a molar tooth.

The instruments shown in Fig. 3 were devised for quickly molding and adjusting the Gutta-Percha Cap-Crowns on the teeth. They possess so many points of merit that we have incorporated them in our set of plastic filling-instruments as Nos. 53, 54, 55.

The Gutta-Percha Cap-Crowns are made in four sizes and put up in boxes containing one dozen, assorted sizes.



Gutta-Percha Cap-Crowns	per box	\$0.50
Instruments, Long Handle, Nos. 53, 54, 55.....	each	.50
“ for Cone-Socket Handles, Nos. 53, 54, 55....	“	.35

IMPROVED GUTTA-PERCHA ROOT-CANAL POINTS.

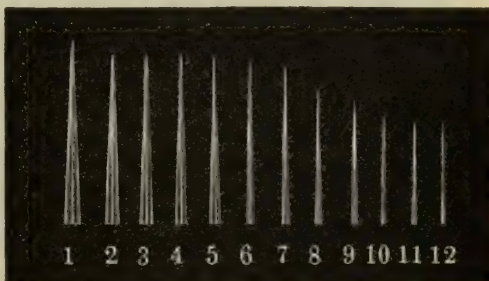
These Improved Gutta-Percha Root-Canal Points are made somewhat flattened on two sides, instead of round as formerly. The advantage of this form is that it permits the escape of air during the insertion of the point, and so prevents the possibility of irritation from imprisoning any of the air contained in the canal. Being made by machinery,

each of the twelve sizes is uniform in shape and caliber. These range from almost a hair-line thickness to the largest size required.

Made of “Premium” Gutta-Percha, and put up in boxes of 150 Points, assorted.

Priceper box \$0.25

The old round form Gutta-Percha Canal Points are still supplied, *upon order*, at 50 cents a box. If round are not specified in the order, we send the new flat-sided Points.



CREASOTED CHARCOAL POINTS.

For the Immediate and Radical Cure of Alveolar Abscess.

Uniformly Successful.

The success of Creasoted Charcoal Points has been so uniform that there are now numerous testimonials to their efficacy. At a recent meeting of the California State Dental Association their inventor, Dr. E. R. Tait, of San Francisco, gave a clinic demonstrating their use. The discussion which followed afforded the opportunity to a number of the best-known practitioners in the state to testify their appreciation of the help the Creasoted Charcoal Points had been to them.

No Tedious Treatment.

One special advantage claimed for these Points is that no attention need be paid to the presence of pus or pericementitis; the Points will attend to them. The canal is simply cleaned out, enlarged, and straightened, a Point inserted, well tamped down so as to break up the charcoal and fill the canal with it, and sealed in with cement. Usually there is complete cessation of pain in a few hours, and within two or three days the filling can be inserted.

Permanently Aseptic.

Creasoted Charcoal Points are made of selected charcoal, and after being carefully shaped they are put into a bath of creasote, there to remain till they are taken out for use. This insures thorough saturation of the Points with the medicine. They therefore combine the advantages of charcoal and creasote, and, being allowed to remain in the canal, make a permanently antiseptic and therefore aseptic filling.

Put up in rubber-stoppered glass tubes, one dozen to the tube, and inclosed in a sliding box, with directions for use.

Priceper tube \$0.50

The S. S. White Dental Manufacturing Co., Sole Agent.

ANTI-FOG.

A preparation to prevent the condensation of moisture on mouth-mirrors and eye-glasses. A very thin film of the Anti-Fog spread over the surface of the glass and then wiped off with a soft material will prevent condensation for about thirty-six hours, when the application should be renewed. The application and subsequent removal of the Anti-Fog is an excellent cleanser for the glass.

Put up in screw-top glass jars.

Priceper jar \$0.25

Weston's Insoluble Cement.

The reasons why "Weston's Insoluble Cement" continues after more than a score of years to lead all others in its sales are because it works satisfactorily, sets hard, and preserves the teeth in which it is placed. A generation of usefulness asserts that it is a good cement, which is the kind the dentist is looking for.

Put up in three forms:

One-Color Case,—Regular Gray Color, suitable for general use.

Two-Color Case,—Gray and Yellow, the two most commonly used shades, in large quantity.

Four-Color Case,—White, Yellow, Blue, Brown,—a companion to the One- or Two-Color Case to give variety of shades to meet all needs.



TWO-COLOR CASE.

Actual Size.

PRICES.

One-Color Case.....	each	\$0.50;	lot of 10 cases	\$4.50
Two- " "	"	.75;	" "	7.00
Four- " "	"	.75;	" "	7.00

WESTON'S CROWN AND BRIDGE CEMENT.

This preparation was made especially to serve the purposes of crown- and bridge-workers. They needed a cement which could be relied on to hold bridges in place without fear of its becoming disintegrated and so loosening the bridge. Its first requirement was toughness or tensile strength, it must not be brittle. It must be "hydraulic" in its nature,—must set under water, be able to continuously resist the action of the fluids of the mouth, and hold the bridge without faltering.

That is the kind of a cement Weston's Crown and Bridge is. It is a reliable lute; holds crown or bridge or regulating appliance or inlay without fear of their becoming detached. It sets under water with a glossy surface. It remains unchanged in the mouth. It was devised for the purpose, by one of the most experienced manufacturers of dental cements, whose knowledge of the subject is testified by several successful filling cements,—Agate, Weston's Insoluble, and Xenolite, for instance.

Just as some of the filling cements possess some luting qualities, so Weston's Crown and Bridge Cement is endowed with characteristics which make it useful in filling some classes of cavities. Thus, it sets dense so quickly from a thin mix that it can be used in cavities which will not bear the pressure required in packing other cements. It can be safely placed in sheltered and accessible cavities, in labial and buccal surfaces, and can be used as a basis in composite fillings.

Heat accelerates the setting of Crown and Bridge Cement.

Put up in $\frac{7}{8}$ -oz. boxes. Prepared by H. Weston, D.D.S.

Price.....	per box \$1.50
"	10 boxes 11.25

The S. S. White Dental Mfg. Co., Sole Agent.

FOSSILINE.

A mineral stopping which will not change color. This Cement has met with an extensive sale in Great Britain, and has been favorably received by American dentists. The important features claimed for it are that it is a non-irritant; that it will harden under water or saliva, and stand the action of the fluids of the mouth better than any other filling of its class.

PRICE.

Per package	\$2.00
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The S. S. White Dental Mfg. Co., Sole Agent for the United States.

JAPANESE BIBULOUS PAPER.

There are a variety of these papers made from a low to a high grade. We have selected that quality best adapted to the dentist's needs.

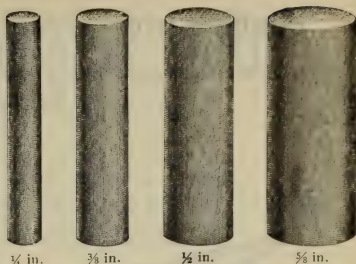
Price, per 100 sheets.....	\$0.25
" " 1000	2.25

For neatness and convenience in handling we offer this paper in small sheets $3\frac{1}{2} \times 5\frac{1}{4}$ inches, 400 put up in a nicely covered, sliding pasteboard box. Handy to keep this way and handy to use.

Price.....	per box of 400 sheets \$0.25
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ABSORBENT COTTON ROLLS.

These Absorbent Cotton Rolls are really the finest absorbent preparation we handle. Their absorbent capacity is equal to that of the finest loose cotton, they can be utilized wherever the loose cotton can be and at least as conveniently, and then they have certain advantages in the handling. The two lengths and four diameters of rolls, and the facility with which they can be cut—cleanly and sharply—into any desired size or shape, give them an almost unlimited range of usefulness, wherever an absorbent is required.



This form of Absorbent Cotton is especially appreciated in crown and bridge operations; and it also advantageously replaces napkins in examinations and in that large and varied class of brief operations where it seems hardly worth while to apply the dam and clamp.

The absorbent Cotton Rolls are made in two lengths, 1½ and 6 inches long, and of four diameters, about ⅛-in., ⅓-in., ½-in., and ⅝-in.

PRICE.

Box of 100 6-in. Rolls, assorted diameters.....	\$0.50
“ “ 1½-in. “ “ “ .....	.25

SPUNK.

Spunk is one of the oldest, perhaps *the* oldest, absorbent used in dentistry, and there are plenty of dentists who prefer it to any of its modern rivals. The Spunk which we sell is always carefully selected. We sell it, as it runs, at 20 cents an ounce or \$2.25 a pound; selected, at 50 cents an ounce.

ASEPTIC DOILIES.

There is absolutely no suspicion of uncleanness in an Aseptic Doily, such as may attach to one which has been laundered. The patient knows that the Aseptic Doily has never been used before; it is clean, it is sweet. It begets confidence in the personal cleanliness of the operator; it gives assurance that the spirit of cleanness, as well as the semblance, is observed in the office in which it is used. All of this is a distinct advantage to the dentist, and this advantage he gains through a direct pecuniary profit to himself.

It costs less to use Aseptic Doilies, which are thrown away after being used once, than to launder the old kind.

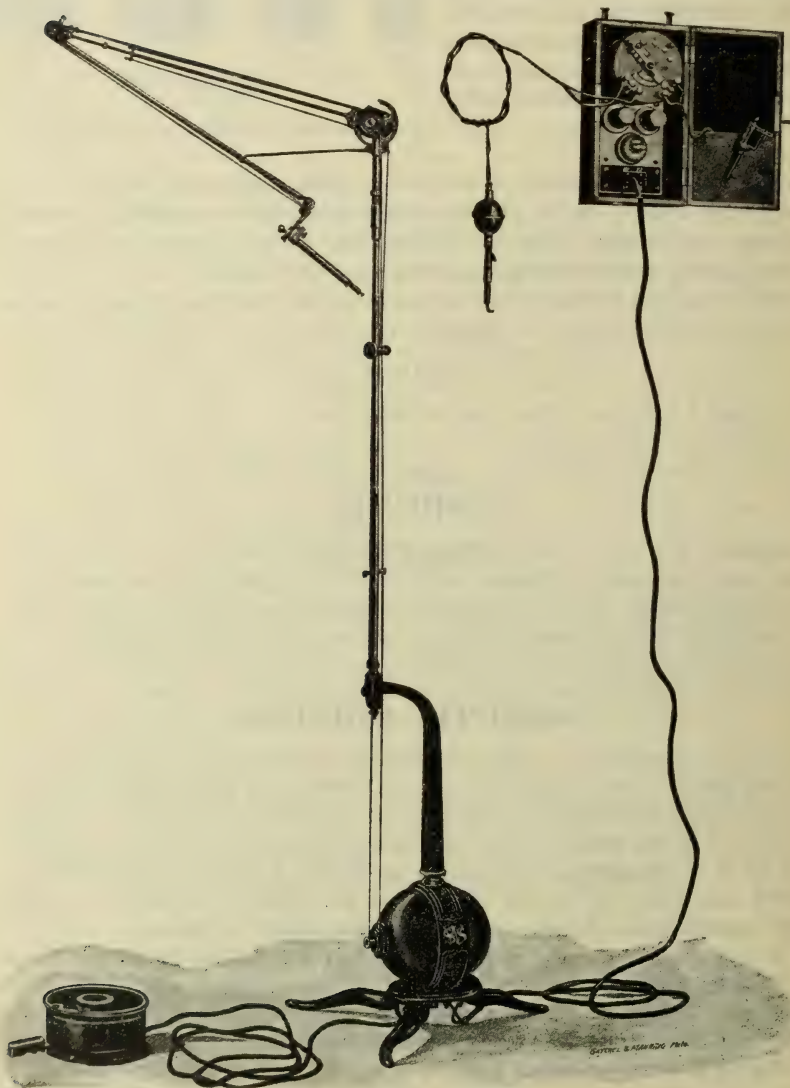
Aseptic Doilies are neater, cleaner, and cheaper. IF YOU USE THEM ONCE YOU WILL SEE THEIR ADVANTAGES AND KEEP ON.

Put up in boxes of 50 and 500.

Price.....	box of 50	\$0.20
“	500	1.30
		35

IMPROVED
Double-Lever Treadle-Rheostat Outfit,
With Dust-proof No. 4 Motor Stand and A1 Motor
and Transformer.

Patented August 15, 1893; July 24, 1894. Other patents pending.



PRICES OF

Treadle=Rheostat Outfits.

(All former Treadle-Rheostat prices are superseded by this list.)

IMPROVED DOUBLE-LEVER TREADLE-RHEOSTAT WITH No. 4 STAND AND B1 MOTOR.

Electrical Outfit alone, including Treadle-Rheostat, No. 4 Stand, B1 Motor, Connecting Cord and Plug, but without Engine Arm or Standard	\$75.00
The same Electric Outfit with S. S. W. Standard, Pulley Head, Flexible Arm, Duplex Spring, Arm Support, and No. 6 or No. 7 Hand-piece	103.00
The same Electric Outfit with Cord Engine Standard and Upper Arm, S. S. W. Pulley Head, Flexible Arm, Duplex Spring, Arm Support, and No. 6 or No. 7 Hand-piece	115.00
The same Electric Outfit with Doriot Arm and A Hand-piece on Doriot Special Standard with rack and pinion adjustment	123.00
When furnished with regular Doriot Standard, such as used on foot-engines, this outfit will be	119.00
Wall Switch E adds to above prices	4.50

IMPROVED DOUBLE-LEVER TREADLE-RHEOSTAT WITH No. 4 STAND AND A1 MOTOR.

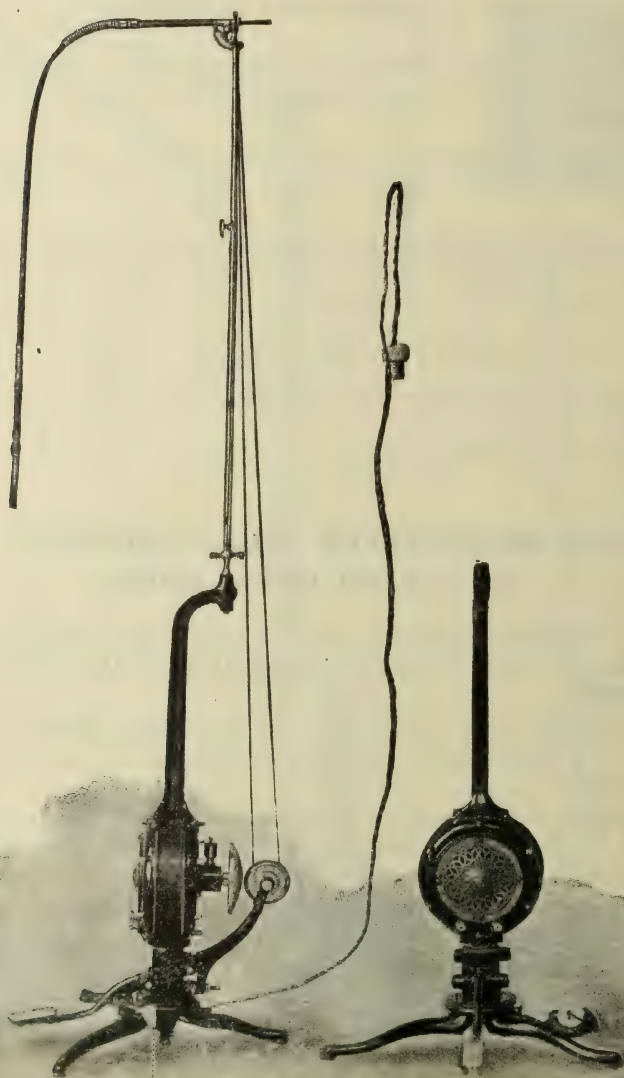
Electrical Outfit alone, including Treadle-Rheostat, No. 4 Stand, A1 Motor and Plain Transformer, but without Engine Arm or Standard	\$120.00
The same Electric Outfit with S. S. W. Standard, Pulley Head, Flexible Arm, Duplex Spring, New Arm Support, and No. 6 or No. 7 Hand-piece	148.00
The same Electric Outfit with Cord Engine Standard and Upper Arm, S. S. W. Pulley Head, Flexible Arm, Duplex Spring, New Arm Support, and No. 6 or No. 7 Hand-piece	160.00
The same Electric Outfit with Doriot Arm and A Hand-piece on Doriot Special Standard with rack and pinion adjustment	168.00
When furnished with regular Doriot Standard, such as used on foot-engines, this outfit will be	164.00
Glass Front Transformer in place of Plain Transformer adds to above prices	2.00

The preceding Outfits with Connecting Cord and Plug in place of Transformer will be \$35.00 less than above prices.

THE S. S. WHITE No. 5 MOTOR STAND OUTFIT

With Mechanical Speed Regulator for
Alternating Current

Patented July 18, 1899; May 21, 1901. D. R. G. M. 138,630.



S

PRICES OF

The S. S. White No. 5 Motor Stand Outfits

With Mechanical Speed Regulator for

Alternating and Direct Currents.

FOR ALTERNATING CURRENT.

No. 5 Motor Stand with Alternate Current Motor and connecting cord and plug, without Standard and Arm	\$62.00
(Furnished for 7200 or 16,000 Alternations and 52 or 104 volts. Other alternations to order.)	
The same Electric Outfit with S. S. White Pulley Head, Arm, Arm Support, Duplex Spring, and No. 6 or No. 7 Hand-piece on S. S. White Standard	90.00
The same Electric Outfit with S. S. White Pulley Head, Arm, Arm Support, Duplex Spring, and No. 6 or No. 7 Hand-piece, mounted on Cord Engine Standard and Upper Arm	102.00
The same Electric Outfit with Doriot Arm and Hand-piece A on Doriot Regular Standard	106.00
Special Doriot Standard with Rack and Pinion adjustment adds \$4.00 to price of this Outfit.	

FOR DIRECT CURRENT.

No. 5 Motor Stand with Direct Current Motor and connecting cord and plug, without Standard and Arm	47.00
(For 110-volt Direct Current. 220-volt Outfit and 6-volt Outfit to order.)	
The same Electric Outfit with The S. S. White Pulley Head, Arm, Arm Support, Duplex Spring and No. 6 or No. 7 Hand-piece on S. S. White Standard	75.00
The same Electric Outfit with The S. S. White Pulley Head, Arm, Arm Support, Duplex Spring, and No. 6 or No. 7 Hand-piece on the Cord Engine Standard and Upper Arm	87.00
The same Electric Outfit with the Doriot Arm and Hand-piece A on Doriot Regular Standard	91.00
Special Doriot Standard with Rack and Pinion adjustment adds \$4.00 to price of this Outfit.	

ENGINE MALLET No. 3.

Patented August 24, 1886;
April 15, 1890; September
5, 1893. D.R.G.M.
No. 101,898.

This mallet has a spring blow—the form of the hammer assures that.

The force of the blow can be changed—made heavier or lighter—at the will of the operator. The device for this purpose is simple, easily operated, and closely adjusted, providing for almost imperceptible gradations.

Three forms of operation are provided for by various methods of assembling: In the first a blow is delivered at each revolution of the hammer wheel, whether or not the plugging point is held against the filling; in the second, no blow is struck unless the plugging point touches the surface to be impacted; in the third, the operator's finger controls the blow.

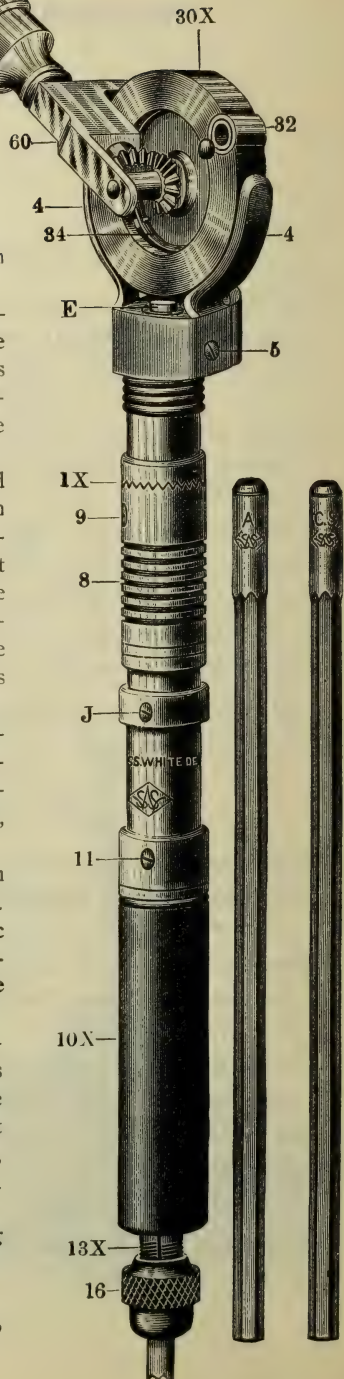
The Mallet is light, comparatively, balances perfectly in the hand, and is so constructed as to provide against undue or uneven wear. The hand-grasp is of vulcanite, giving a comfortable feel in the hand.

Six socket-handles are supplied with each Mallet and included in the price. These socket-handles are for automatic or for cone-socket points, as may be preferred. **Unless otherwise ordered, we supply the former.**

The yoke is made in various modifications for attachment to our Hand-pieces Nos. 6, 7, and 8, or (which we regard the better plan) by means of the Slip-Joint direct to the arms of our various Engines, except the Cord and Doriot. For these a still different organization is supplied.

In ordering, always specify the fitting wanted.

Price, any fitting, with Six Socket-Handles Complete\$12.00



ENGINE MALLET No. 4.

Patented August 13, 1889, and August 19, 1890.

An extremely compact, simple Engine Mallet; works with the engine running in either direction.

The question of durability always comes up in a small instrument of this kind. This is guarded in this appliance by careful proportioning and the liberal use of hardened steel at wearing points. Tests of durability show gratifying results.

The point socket will take the regular Automatic Mallet points.

The No. 4 Mallet may be attached to the hand-piece in manner similar to the method employed with the angle attachments; or, preferably, it may be fitted to the No. 2 slip-joint, the same as the angle hand-pieces.

The rapidity of the blow is regulated by the speed of the engine. Every revolution of the hand-piece spindle gives a distinct blow. The blow approximates that of the Electric Mallet; its strength is regulated by the small collar bearing the two knurled rings at *b*. Screwing the collar to the right increases the force of the blow; to the left, diminishes it.

The small serrated finger slide, *c*, is intended to enable the operator to arrest the blow while the engine is running, particularly to allow him to stop the action of the hammer while he is picking up gold and carrying it to its place in the mouth.

The instrument should be carefully oiled with the best quality of engine lubricant, a drop being introduced through each oil-hole. The tool-holder is oiled where it projects from the case and at the stop-slide.

The principal journal is under the hole shown at *a* in the cut. Before introducing the oil at this hole, revolve the spindle until a passage into the interior is seen to be clear for the oil-can to reach the hammer mechanism.

We should strongly advise against taking this Mallet apart. The idea is this: The constant jar occasioned by the blow will shake loose any threads not firmly screwed up to their shoulders. Special pains therefore are taken in putting this Mallet together to screw everything up tight, so tight, in fact, that special pincers would be required to take it apart without doing damage. Ample facilities are afforded for oiling, so that there should be no need of dismembering it except for repairs.



PRICES.

With Fitting for Nos. 4, 6, 7, and 8 Hand-pieces, or No. 2 Slip-Joint	\$8.00
With Fittings for Doriot Hand-Piece A	10.00

Be sure to specify in ordering which fitting is wanted.

THE ABBOTT AUTOMATIC Mallet.

Patented in Great Britain and United States,
August 16, 1887.



The Abbott Automatic Mallet gives a uniformly dead blow, and with the minimum exertion of force on the part of the operator.

The dead blow is believed to afford the means of knowing when the gold is properly solidified.

Ease of operation conserves the strength of the operator, enables him to do more and better work.

The appliance is simple in construction. The working parts—pivotal latch, tripping mechanism, hammer, and spring—are entirely free from the case, being carried upon a spindle which passes centrally through it. This plan of construction avoids friction. Each end of the spindle is socketed for the reception of the plugger-points, one end giving a push or thrust-blow, the other a pull or back-blow, thus combining in one appliance a direct and a back-action blow, each effective, because actuated by the same mechanism.

All the parts liable to wear are made of hardened steel, and the instrument throughout is constructed in the best manner.

Supplied with all-metal or vulcanite-covered case, as desired, each style with long or short stroke. A and B are all metal; C and D, vulcanite-covered.

A is the form in which the Abbott Mallet has heretofore been sold; B is the same form, but with the length of the stroke reduced about one-fourth, the lessened force being compensated by the greater frequency of blow possible.

C is the long-stroke Mallet in vulcanite-covered case; D the short-stroke.

For the direct blow Cone-Socket or Automatic points may be used.

The force of the blow is regulated in A and B, by turning the milled cap E; in C and D, by turning the nose-cap F.

A, Metal Case, Long Stroke,

B, " " Short Stroke,

C, Vulcanite-covered Case, Long Stroke,

D, " " Short Stroke,

Price,
either style,
\$8.00.

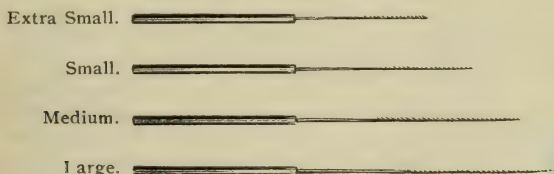
BARBED NERVE-EXTRACTORS.

Making them Finer.

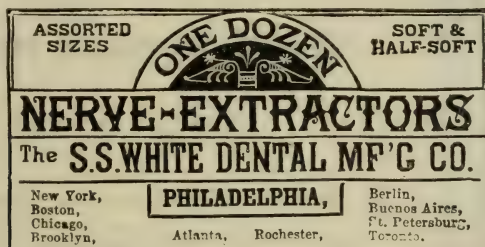
It is easier to make coarse, heavy Nerve-Broaches than it is to keep the caliber down to the thinness most useful in root-canals. That is why there are so many of the thick ones on the market. We took up the matter of eliminating this kind from our stock, years ago; at least, we were determined that the majority of our Broaches should be of the finer calibers, for of course there is use for the coarser ones. It was uphill work; the broach-makers were somewhat "set" in their ways, and the coarser ones were so much easier to make. But we persevered, and we won. They know now what we want, and they also know that we won't have anything else. So we get it,—thin Broach blanks galore. These blanks are cut under our own supervision, so that part of it is also right.

Regular and Extra Thin.

These Broaches are tough and strong,—they wouldn't be put out by us if they were not,—and the sizes—lengths and thicknesses—give every necessary latitude of choice. There are two lines of our Broaches, "Regular" and "Extra Thin." The "Regular" are finer than it was possible to get some years ago, only in exceptional cases, and finer than you are apt to find in other makes. The "Extra Thin" are extremely fine, but the fineness is not secured at the expense of toughness. Both "Regular" and "Extra Thin" are made in these sizes:



These sizes mean lengths, not diameters. All sizes, both "Regular" and "Extra Thin," in "Soft" and "Half-Soft" tempers.



All our Broaches are put up under this label, which is our guarantee of their quality.

IN STOCK AS FOLLOWS:

No. 1, containing one dozen assorted small, extra small, medium, and large sizes,—Soft and Half-Soft.

No. 2, containing one dozen extra small,—Soft and Half-Soft.

No. 3, containing one dozen small,—Soft and Half-Soft.

Other assortments to order without extra charge.

Price.....per package \$0.50

".....per gross 5.00

We send "Regular" unless "Extra Thin" is specified.

IRIDIUM-PLATINUM NERVE EXTRACTORS.



The points are made of an alloy of Iridium and Platinum, the handles of steel, nickel-plated, thus having the advantage that they can be readily cleansed and sterilized by heating them to redness in a spirit lamp. They have ample flexibility and toughness, and are not corroded by iodine, acids, or dampness. Barbed and hooked.

Iridium-Platinum Nerve-Extractors are put up in quarter-dozen boxes, with grooved blocks for safe carriage.

PRICES.

Quarter-Dozen Barbed.....per pkg. \$1.20

Quarter- " Hooked.... " 1.20

NERVE-BROACH HOLDERS.

Nos. 1, 2, and 3.

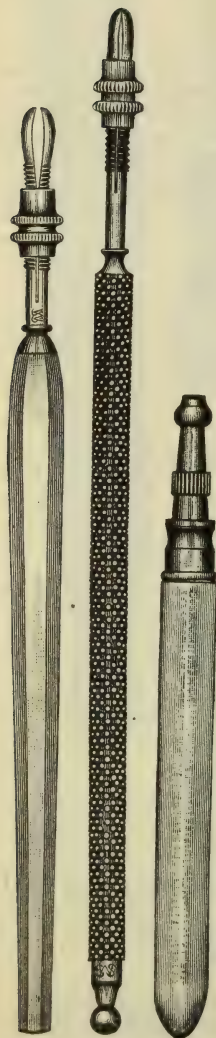
Nos. 1 and 2 have a screw-ring to clamp the jaws so as to hold the broach securely. No. 3 has a screw-clamp.

PRICES.

No. 1, Ivory Handle\$1.00

" 2, Knurled Steel Handle..... .75

" 3, Bone Handle10



No. 1. No. 2. No. 3.

THE GENERAL

SEPARATOR.

Patented July 5, 1887;

January 16, 1894.

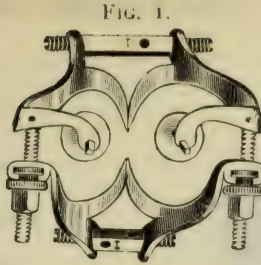


FIG. 2.

FIG. 3.

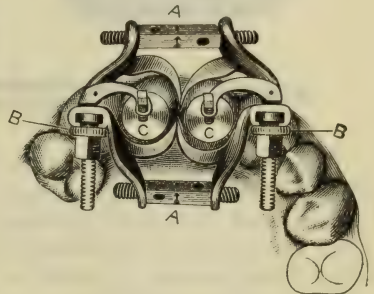
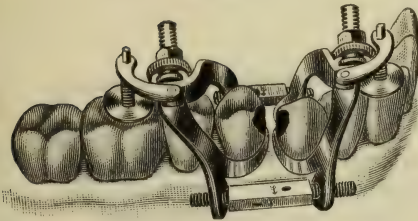


FIG. 5.

FIG. 4.

The General Separator works on the plan of the Perry, but it has special devices to permit it to be applied to any of the teeth. It has, besides, stops, to prevent the separating beaks slipping or being forced against the gums.

The buccal or labial beaks are made separable from the palatal or lingual, the two parts being connected by screw-bolts. The beaks are opened in the same manner as those of the Perry Separators, the bars being turned in the direction of the arrows for that purpose.

The stops have a swinging adjustment, and can be placed upon the teeth to be separated, or upon those adjoining them on either side. They prevent the separating beaks from impinging on the gum, and act as a bar to rocking of the appliance. At any time, one or both of the stops can be removed.

The great adjustability of the General Separator and the control afforded by the stops afford decided advantage in effecting separations, especially when the walls of the cavities are thin.

Fig. 1 is a plan view of the General Separator, which is shown by Fig. 2 in place for separating a cuspid and bicuspid; while in Fig. 3 is seen the same General Separator in place upon a central and lateral.

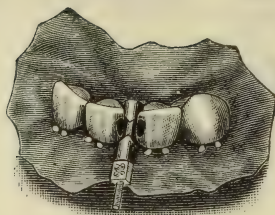
The flexible wrench (Fig. 4) is to turn the stops C C (Fig. 3) down to rest upon the teeth. To screw them hard down, the square hole in the flattened end of the wrench should be used. Fig. 5 shows the wrench for manipulating the bars and the nuts on the screw-bolts for opening and closing the separating beaks. In turning either the bars or nuts care must be taken to move each side alternately, and always in the right direction.

PRICES.

General Separator.....	\$7.00
" " Wrench .....	.50
" " Flexible Wrench .....	.70
" " Complete	8.00

LITTLE GIANT SEPARATOR.

Design Patent June 28, 1898. Patented Aug. 30, 1887.



The principal advantages of this Separator are its small size and its simplicity. It occupies but little room, obstructs no light, doesn't get in the way, and so is not likely to be accidentally thrown out of its adjustment.

Its special use is in the immediate separation of teeth having small approximal cavities, though, as stated below, it can be used effectively wherever there is room to place it.

The device consists of two wedges, one fixed at the end of a shaft, the other loose and controlled by a nut working on a very fine thread on the shaft.

In use the nut and loose wedge are removed, the shaft passed between the teeth to be separated from the lingual or palatal side. The loose wedge is then returned to the shaft, followed by the nut, which is screwed up, forcing the wedges between the teeth till the desired room is gained. The nut is manipulated by a key or wrench, which is magnetized to enable it to pick the nut up readily. The round recess in the wrench is for handling the loose wedge of No. 1, which is quite small.

There are three sizes: No. 1 for use between incisors, Nos. 2 and 3 for bicuspid and molars. They may also be used as matrix holders. In matrix operations the separator may often be applied without removing wedge or nut.

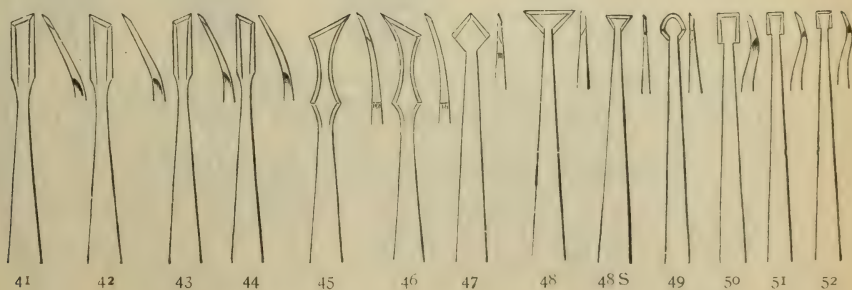
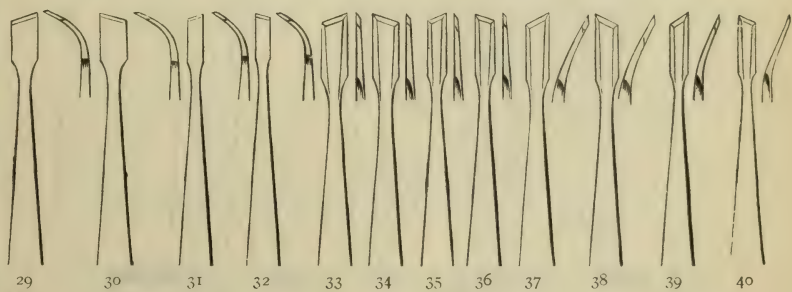
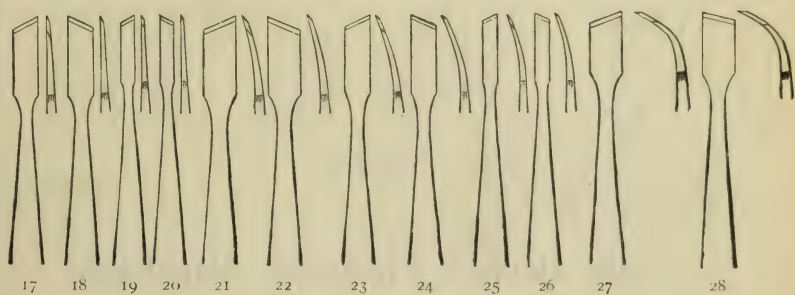
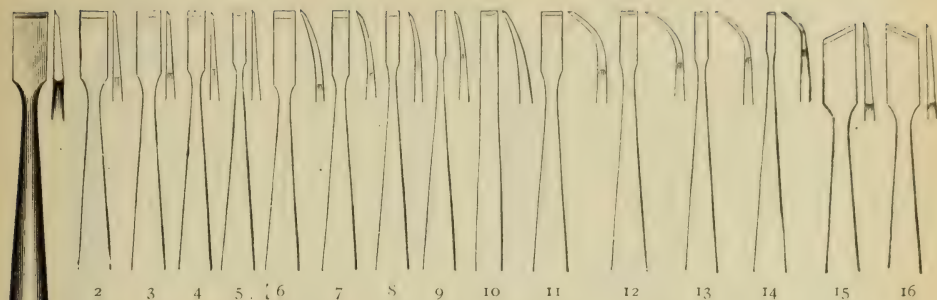
A well-known New York dentist says, "I have been using them for three years, and, while I have every separating device in the market, this little instrument has supplanted them all in every case where there was sufficient space between the necks of the teeth. This occurs in about eighty per cent. of the cases.

"Its chief merits are: small size; non-interference with the operator; protection to the rubber dam; delicacy so that it works by minute stages with minimum pain to the patient,—of advantage where the separation is to be increased as the work progresses, especially where a matrix is used and no separation desired until the work is completed, when space is required to polish without destroying contour."

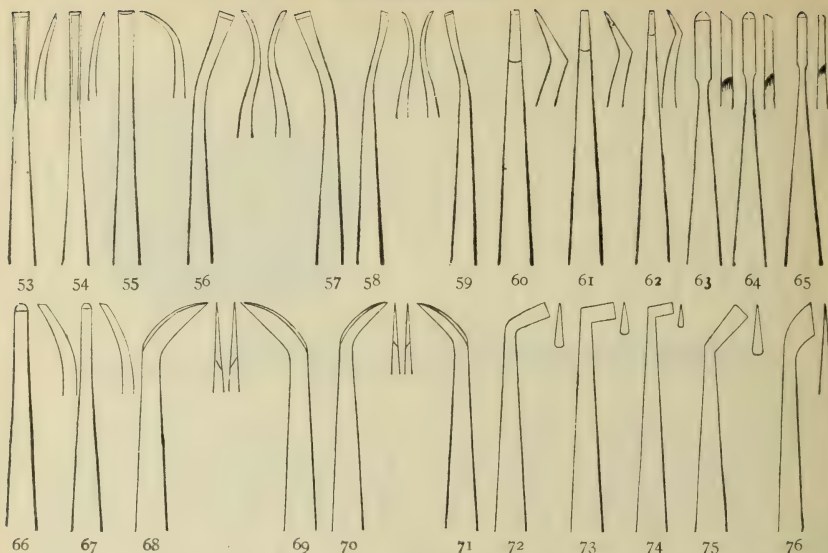
PRICES.

Set complete	\$3.75
Separately—No. 1, No. 2, or No. 3.....each	1.15
Wrench	" .40

CHISELS.



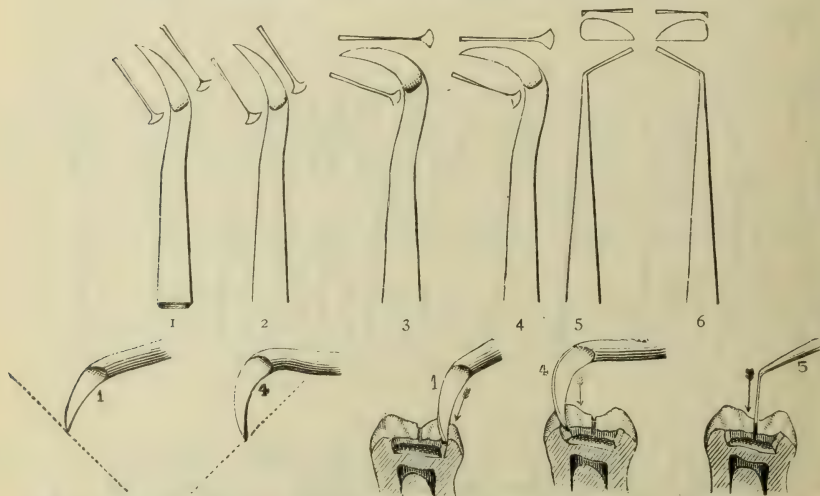
CHISELS.



PRICES.

File-cut Handles	each \$0.50
Cone-Socket Points	“ .35

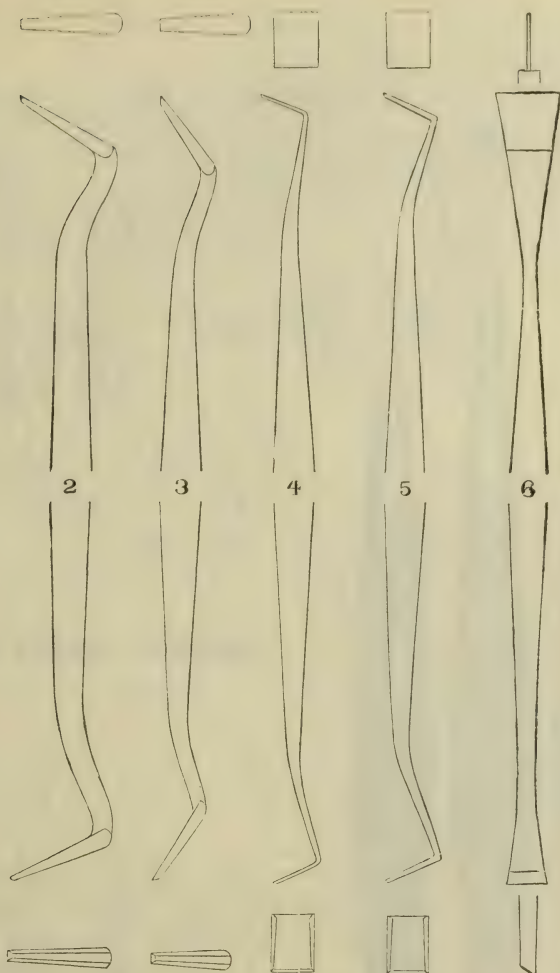
DR. HOW'S FISSURE CHISELS.



Made very hard and very thin, with the *inner* edges of Nos. 1 and 3 thicker than their *outer* edges, while Nos. 2 and 4 are thickest at their *outer* edges. They cut only on the *floor* of a fissure, and deepen it without wasting time or force on the *sides*. A groove is thus quickly cut with nearly square walls for the retention of the fillings. Nos. 5 and 6 are right and left, for cutting lateral fissures in like manner. See the supplemental illustrations, which also show the angle for a slight bevel of the cutting-end after it has been given a wedge-point. The instruments will also serve as superior scalers.

Price, $\frac{1}{4}$ -inch File-cut Long Handles.....	each \$0.65
“ Cone-Socket Points	“ .50

BROWN'S "HEROIC" CHISELS.



This set of instruments is designed to do nearly all the heavy trimming away of enamel, both on the exposed surfaces of the teeth and on their approximal surfaces. Several of the points are also valuable for scaling calculus and removing stains.

The forms of the heavy points will explain their uses, for "heroic" chiseling; the thin blades only to be used where necessary on account of limited space between the teeth.

Made only on Octagon Steel Handles.

PRICES.

Nos. 1, 2, 3.....	each \$1.50
" 4, 5, 6.....	" 1.60.

SET OF CARVING TOOLS.

Designed by DR. W. W. EVANS.

The dentist has frequent use, in shaping wax models, for fine carving instruments. In carving teeth they are a necessity. This set of three double-end tools was arranged originally for use in the preparation of wax models for celluloid work, but they will be found well adapted for all carving purposes where fine work is required, as in wax, clay, or unbaked porcelain.

Nos. 1 and 2 have steel points, at one end of each a carver similar to Dr. Kingsley's well-known vulcanite finishers; at the end a knife-blade, that of No. 1 being curved, while No. 2 is straight.

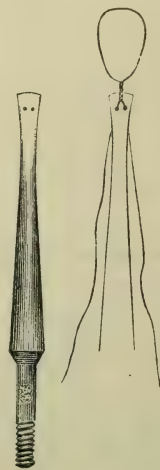
The points of No. 3 are ivory, having a wide range of usefulness as burnishers and wax spatulas, especially in working the wax into the interstices to form the festoons of the gum. Made with apple-wood handles.

PRICES.

Nos. 1 and 2 each \$1.25
No. 3 " 1.50

HANDY DENTIMETER.

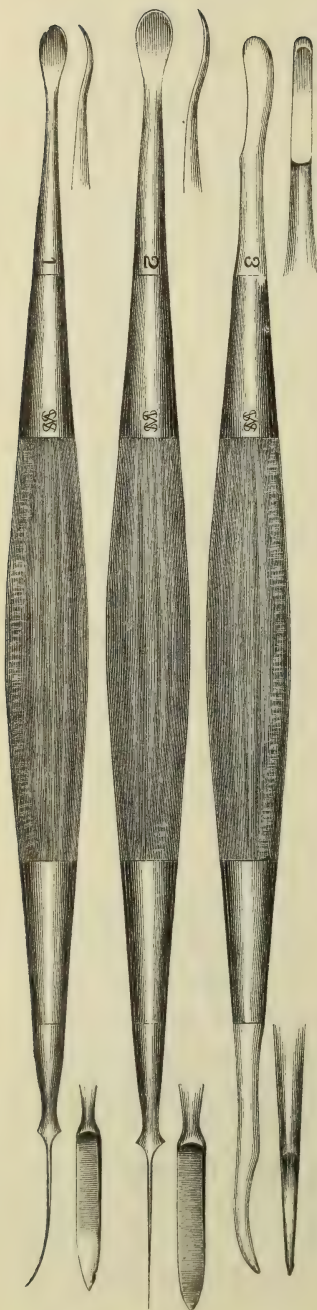
Suggested by DR. F. H. ABELL.



In the Handy Dentimeter, the wire ends are passed through the holes in the flattened head, and after the loop is adjusted and tightened, twisted firmly, holding the strands with the fingers.

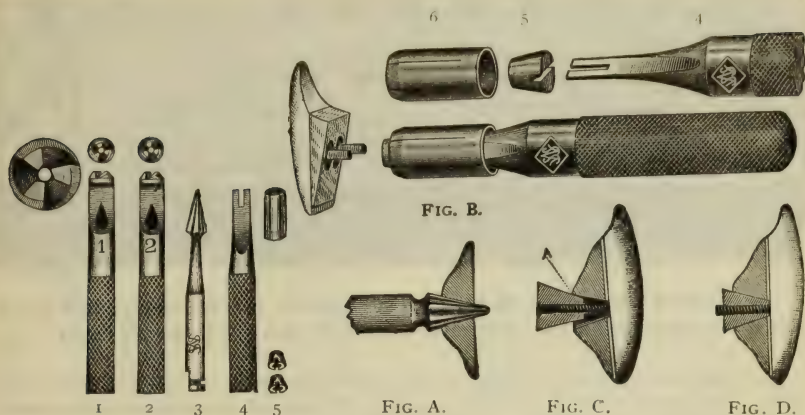
Made only for Cone-Socket Handles.

Price \$0.35



BRIDGE-REPAIR TOOLS.

Approved by DR. E. A. BRYANT, inventor of the original set.



Select the facing to be attached, clip off the pins from the bridge, and smooth the backing to a flat surface. Drill two holes, size of the pins, through the backing for the reception of the pins of the new facing. With the right-angle engine reamer No. 3 countersink from the rear until the reamer comes through to the front far enough to suitably enlarge the holes (Fig. A). Fit the facing, grinding the backing or the tooth to accomplish this result. When fitted, cut threads on the pins of the facing, first with the larger size die (No. 1), then with the smaller (No. 2). In cutting the threads, care should be taken not to force it too fast, and a little oil should be used, otherwise one may twist off the pins.

Put a nut, No. 5, into the holder, 6, and push the nut-driver No. 4 into 6 until the small end of No. 5 projects from 6. The nut will not fall when held at any angle, but can be screwed onto the threaded tooth-pin; the springy split holder permitting ready release from the seated nut in the backing. See enlarged illustration Fig. B.

Place the facing in position and with thumb or finger hold it against the backing. Turn a nut onto one pin part way, as at A (Fig. C), pull off the holder, put in a nut and screw it onto the other pin. Screw first one, and then the other, until both nuts are seated as in Fig. D. To avoid breaking the facing, or stripping the threads, turn the nuts alternately until both are set home firmly without undue force on the nut-driver, yet be sure that the facing is fixed tight. Then grind off the protruding parts and make smooth with paper disks.

Not only may speedy and strong crown and bridge repairs be made with this set of ingenious instruments, but new work may thus be made removable for ready replacement in case of accident.

If the pins are bent and the nut strikes the edge as at A, Fig. C, straighten by pulling the nut and pin toward side it does not strike, till it goes home (Fig. D).

The numbered cuts show the exact sizes of the tools. Figures A, B, C, and D are magnified views showing their application. With the exception of No. 3, they are operated with thumb and forefinger without overdue twisting force on pin or nut. Reamer No. 3 is kept in stock to fit all right angles.

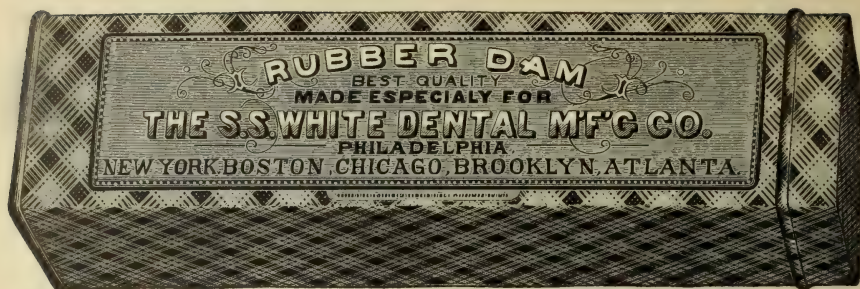
PRICES.

Nos. 1 and 2. Tooth-pin Dies	each	\$0.75
No. 3. Right-Angle Reamers.....	"	.25
" 4. Nut-Drivers with Holder	"	.25
" 5. Gold Nuts	"	.50

The Set in box containing one each of Nos. 1, 2, 3, 4, and two of No. 5

When ordering, state for which style of Right-Angle No. 3 is wanted.

RUBBER DAM.



The Rubber Dam we sell is made expressly to our order, and not a roll is accepted until by sufficient tests it is proved to be all right.

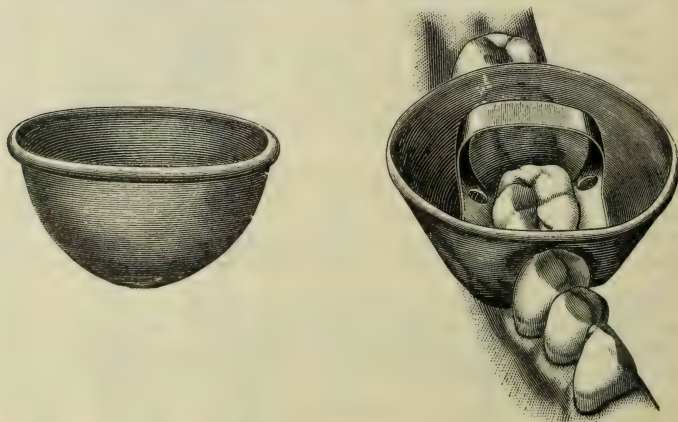
We sell Rubber Dam in three forms,—in the sheet and in 5-in. and 7-in. rolls. Our sheet Dam is 35 inches wide. A yard of it contains 1260 square inches; a half-yard 630 square inches. Our roll Dams are sold on the same basis. The 5-in. yard roll is 21 feet long, the 7-in. yard roll 15 feet; half-yards half length. In either form of our Rubber Dam you will get a quality that is unequaled elsewhere; strong and durable, and does not tear on being stretched over the teeth if properly punched.

Our roll Dams are put up in square enameled metal cases, yard and half-yard.

PRICES.

Thin, Sheet or Roll.....	per	yard	\$1.25
“ “ “	“ 1/2	“	.63
Medium “ “	“	“	1.75
“ “ “	“ 1/2	“	.88

DENHAM'S COFFER DAM SHIELDS.



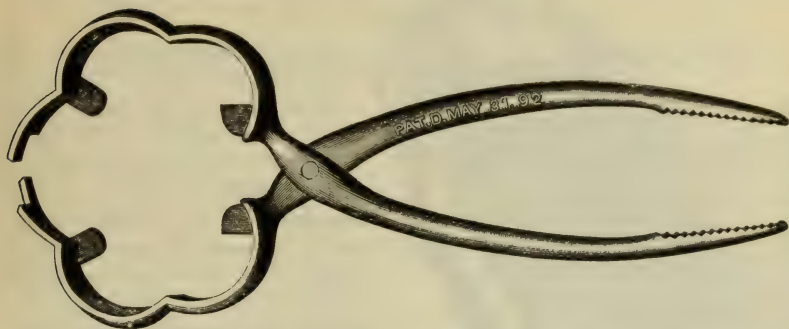
The material of these Shields is elastic rubber similar to the rubber dam, for which they will, in many cases, prove a convenient substitute, especially where it is difficult to apply the rubber dam, and when it is necessary to treat the teeth with medicaments.

The Shields may be used with Rubber-Dam Clamps as shown in the cut. Put up in boxes containing 1 dozen.

Price.....per box \$0.60

FLASK LIFTER AND HOLDER.

Invention of DR. E. A. BRYANT. Patented May 31, 1892.



This Flask Lifter is a convenient tool for handling flasks. The serrated ends of the handles are perfectly adapted for lifting the flask from the vulcanizer, and the clamp end holds any size or form of flask, while fastening screws, or for other manipulation. It is well finished, and heavily japanned to prevent rusting.

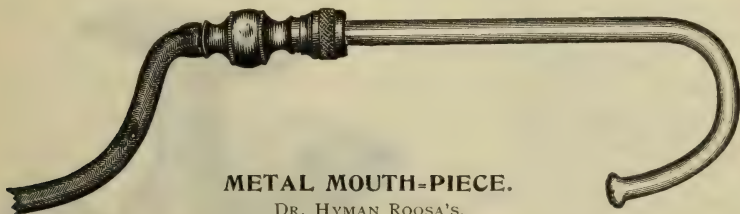
Illustration a little more than one-third size.

Price \$0.65

Mouth-Pieces for Saliva Ejectors.

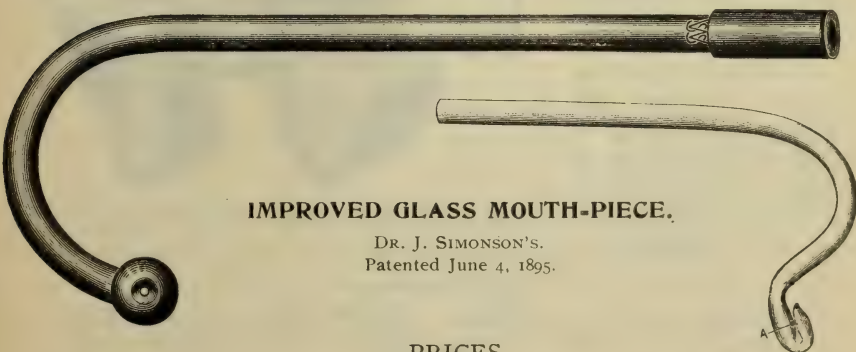
There are three styles of Mouth-Pieces for Saliva Ejectors, as shown here-with:

PLAIN GLASS MOUTH-PIECE.



METAL MOUTH-PIECE.

DR. HYMAN ROOSA'S.



IMPROVED GLASS MOUTH-PIECE.

DR. J. SIMONSON'S.
Patented June 4, 1895.

PRICES.

	Per Dozen.	Each.
Plain Glass	\$0.50	\$0.05
Improved Glass (Simonson's).....	1.00	.10
Metal (Roosa's) .....		.75

BENCH BLOCK.

Patented Sept. 24, 1889.
by DR. E. R. MAGNUS.



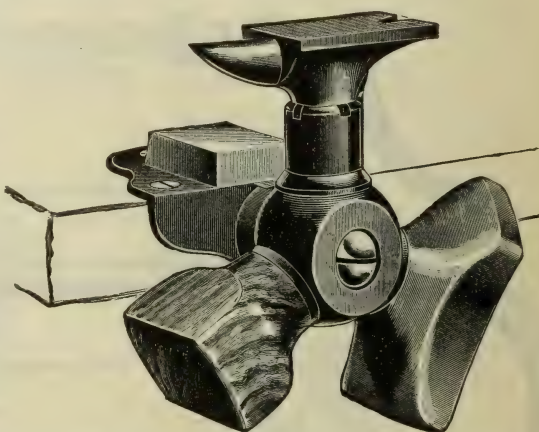
The advantages of this device are appreciable at a glance. The frame is made of cast iron (gray, nickel finish), surmounted by a chilled-face anvil. It carries a thick block of par-vulcanized rubber, which for the purposes of a filing-block is greatly superior to any other material. The frame can be fastened to the laboratory or office bench by the three screws which accompany it. The rubber blocks can be replaced when worn. There are two sizes; the large size is 5 inches long over all by $2\frac{1}{4}$ inches wide. The small size is $4\frac{3}{8}$ inches long by $1\frac{5}{8}$ inches wide.

Price, either size each \$1.25
Rubber Blocks, separately " .35

Revolving Combination Anvil and Bench Block.

Devised by G. W. MELOTTE, M.D.S.
Patented Sept. 13, 1892.

This combination tool consists of a hub carrying a case-hardened steel anvil, a par-vulcanized rubber block for filing, and a wood block for the same purpose, mounted on a bracket to be fastened to the work-bench of the laboratory. It is adjusted by pulling out the hub slightly, revolving it until the proper appliance is in position, then releasing, when it is held firmly as placed by a friction-clutch.



The bracket also affords a hammering surface.

Price, complete \$3.00

DUPLICATE PARTS.

Brackets	each \$0.50	Rubber Blocks.....	each \$0.35
Anvils	" 1.00	Wood "	" .15

THE S. S. WHITE DENTAL MANUFACTURING CO.,

Sole Agent for the dental trade for all countries except the United Kingdom of Great Britain and Ireland.

NASO-PHARYNGEAL LAVAGE

AS A PREVENTIVE OF

IRREGULARITIES OF THE TEETH.

Mouth-breathers invariably have irregularity, or as it is perhaps more euphoniously named, mal-occlusion, of the teeth. Indeed, mouth-breathing is one of the recognized principal causes of mal-occlusion of the form involved in the flattening of the sides of the arch.

Cause of Mouth-Breathing.

Now, what causes mouth-breathing? Obstructions in the nasal passages, which arise in many cases from continued or frequent irritation of the mucous membrane. It has been demonstrated that the normal mucous secretions of the nose have a bactericidal potency which is an important factor in purifying the air breathed into the lungs. But when the secretions are retained in the nose unduly they become altered in character and irritate the membrane. This irritation if frequent or long continued sets up an inflammation, hypertrophy of the bony or soft tissues follows, and in time partial or complete stenosis of one or both air-passages results. The natural channel for the air being thus reduced the supply of air is lessened to the point of insufficiency, and the victim perforce opens the mouth to breathe.

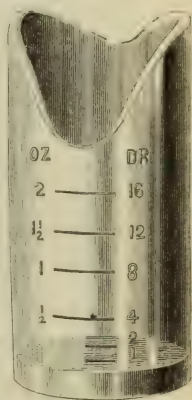


Illustration about two-thirds actual size.

The Nose Cup.

The obvious preventive is to keep the naso-pharynx in a healthy condition by frustrating the accumulation of the secretions. Nasal irrigation has long been recognized as a desirable practice, and fortunately a simple, safe device for its accomplishment is now at hand in the McK. & R. Nose Cup.

It has been found not necessary to deluge the nose with water under pressure in order to clear out the accumulation. The mere presence for a few minutes of a thin film of water on the floor of the nasal passage serves the purpose. It softens the obstructing masses and stimulates a fresh secretion of normal mucus beneath them, and thus *floats* them off, so to speak.

Effective and Safe.

The Nose Cup affords the means for this gentle but effective lavage of the naso-pharyngeal tract, without risk of forcing the irrigating fluid (clean water, alone or with a mild admixture of an antiseptic agent) into the Eustachian tubes. Proper lavage of the air-passages will unquestionably prevent the formation of the habit of mouth-breathing, and opens the way to cure, when the difficulty is due, as it is in the majority of cases, to the accumulation of mucus. Naso-pharyngeal lavage will become as much a part of the daily toilet as the cleansing of the teeth.

The Nose Cup is made of glass, 3 inches high by 1 3/4 inches in diameter, graduated from one dram to two ounces.

Full directions accompany it.

Price \$0.25

The S. S. White Dental Mfg. Co., Sole Agent for the Dental Trade.

Lining Vulcanite Dentures

WITH

GOLD OR ALUMINUM.

Dr. M. P. Boyd's Process.

Special Lining Not Required.

Dr. Boyd's process possesses this advantage, that the foils used in filling operations are utilized in his method, and the results are equal to those which require the purchase of special "linings." The heavier foils, like Nos. 10, 20, 40, and 60, are best adapted for this use, but No. 4 cohesive, which almost every dentist employs in his operative work, can be utilized as well, with a little care in folding.

The Special Materials.

The special materials essential to the Boyd process are the Vulca (the binder with which the foil is attached to the plate), and the Adhesit (with which it is temporarily affixed to the model). All the other articles are found in a well-ordered dental laboratory. (If the dentures are to be lined with aluminum, it will of course be necessary to get the foil, which is *not* used in all laboratories.)

The Main Point.

The Vulca is the main thing. It is a sort of cement which, placed upon the surface of the foil after it has been burnished to the model, attaches it firmly to the vulcanite in the process of vulcanization. It is, in effect, a vulcanite solder. There is no question about the fit, if the model has been properly prepared and the foil properly burnished to it. There's only the thickness of the foil between the plate and the model, and the effect of that can only be to make a better, closer fit.

The Outfit.

There are two forms of the Vulca,—one for working with gold foil, the other for aluminum.

For working with Gold Foil, there are required a box of Vulca No. 1, a bottle of Adhesit, a bottle of Silex, Soapstone Powder, a No. 6 Office Preparation Bottle, and three Brushes, A, small; B, large; C, small.

For Aluminum Foil, the requirements are the same, except that Vulca No. 2 is substituted for the No. 1.

PRICES.

Vulca, No. 1 (sufficient for at least eight upper cases) ..	per box	\$1.00
" " 2 (sufficient for at least twelve upper cases) ..	"	1.00
Adhesit	per bottle	.25
Aluminum Foil (25 sheets)	per book	.30
Camel's-hair Brushes, A, B, C	each	.06
Liquid Silex	per bottle	.20
Soapstone Powder	per box	.10
No. 6 Office Preparation Bottle	each	.15

Modelling Composition for Impressions.



Our Modelling Composition is of medium temper,—neither too hard nor too soft,—and adapted to all the ordinary uses of the dentist; softens either in dry heat or hot water,—the latter preferably; sets quickly, say in one and a half minutes.

Dentists who do not find exactly the characteristics they want in either plaster or wax will do well to try the Modelling Composition. When softened it readily takes the contour of surfaces against which it is pressed, forming a clean, sharp impression, and when again set it is remarkably rigid, holding its shape firmly. It has also the decided advantage of almost entire freedom from shrinkage in hardening. Many practitioners prefer Modelling Composition to either wax or plaster, and use it exclusively.

Put up in half-pound enameled metal boxes.

Price.....	per lb.	\$0.75
“	in 10-lb. lots “	.65

Modelling Composition for Base=Plates.

Put up in Enameled Metal Boxes.

The easy manipulation of Modelling Composition and its rigidity early suggested to Dr. W. S. Elliott its use for base or “trial” plates, for which purpose it proved to be particularly well adapted.

We put it up for this purpose in oblong sheets $5\frac{3}{4} \times 3$ in.

Price, in half-pound boxes.....per box \$0.63

EXTRA TOUGH PINK PARAFFIN AND WAX.



The extreme toughness of this preparation makes it especially desirable for base or trial plates. It can be carved nicely with a sharp instrument. In making an investment for a vulcanite denture, when you get ready to remove the wax trial plate, if you use Extra Tough Pink Paraffin and Wax, you can remove it, when properly softened with hot water, almost entire. Its toughness holds it together so that it comes away in one piece; does not run or dissolve and find its way into the plaster to soften it.

Put up in half-pound boxes, containing sheets $5\frac{3}{4} \times 3$ inches.

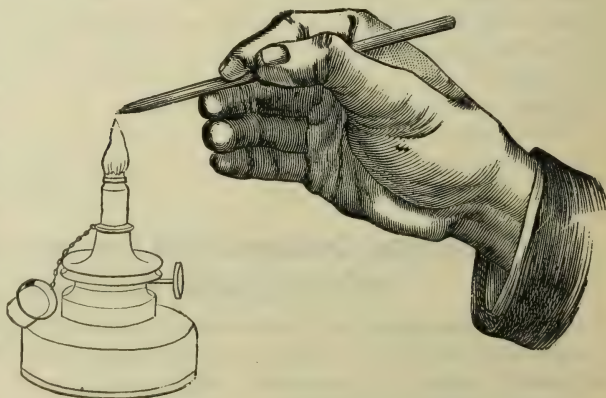
Priceper box \$0.50

EXTRA TOUGH PINK PARAFFIN AND WAX.

IN STICK FORM.

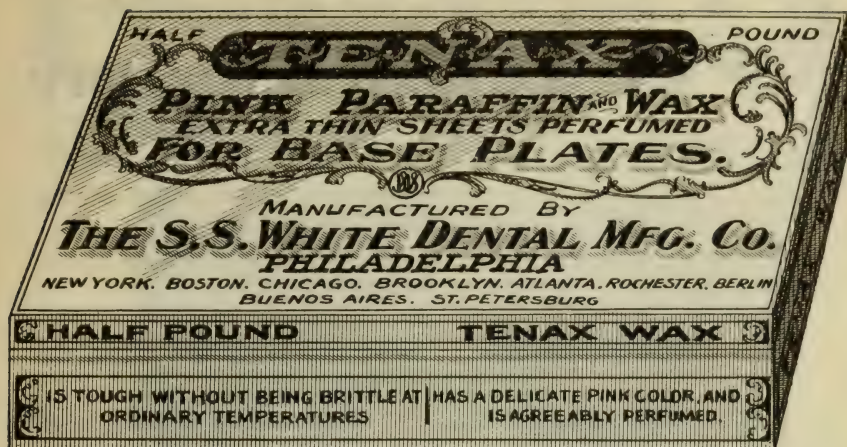
PUT UP IN ENAMELED METAL BOXES.

Extra Tough Pink Paraffin and Wax in sticks is exactly the same in quality as that in sheets for base plates. The form makes it convenient for waxing up cases, for which purpose its toughness admirably fits it.



Price, in half-pound boxes.....per box \$0.50

TENAX WAX.



The principal virtue of Tenax Wax is its extreme toughness. That is what makes it so useful for trial-plates. It can be shaped over the cast quickly; it takes a sharp contour of the surfaces it is applied to, and holds it. Useful also, therefore, to take bites. Within the range of 65° to 90° F., it holds its shape practically unchanged.

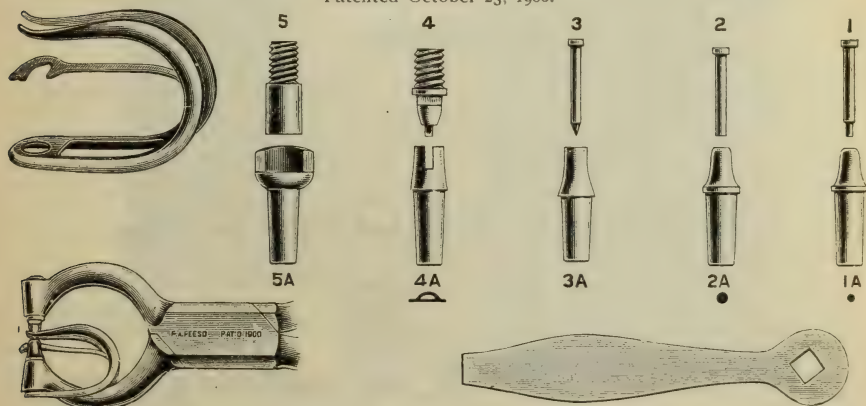
Tenax is pink in color; has a delightful perfume. Made in thin sheets, 5½ x 3 inches, tissue paper between the sheets, so that they can be easily separated. Put up in half-pound enameled tin boxes.

Price.....per box \$0.50

DR. FRED. A. PEESO'S

Combination Dental Plate Punch and Stripper.

Patented October 23, 1900.



Will do the work of seven (7) different instruments, and will be found indispensable to all Dentists. Approved and adopted by leading members of the Faculty. All dies and strippers interchangeable and instantly adjustable. Worn or broken parts can be at once replaced at small cost.

Extra heavy frame Forceps with Stripper, Nipper, Looper, 3 Punches and Dies, and Wrench in neat Plush-lined Case, \$7.50.

WM. EGLIN, Sole Licensee,
235 South 42d St.,
PHILADELPHIA, Pa.

To be had of all the
Principal Dental Supply
Houses.



REMEMBER
WE ARE IN
POSITION TO
DO BUSINESS
WITH EVERY
DENTIST IN THE
UNITED STATES.

REGULATING APPLIANCES,
ETC., OF EVERY DE-
SCRIPTION MADE
TO ORDER.

HAVE YOUR
Gold Crown= and Bridge=Work
MADE AT THE
Phila. Crown Laboratory

45 N. THIRTEENTH STREET

PHILADELPHIA

All Crowns are special,—i.e., all are made according to the requirements of each individual case.

We guarantee satisfaction. To insure the most desirable results, it is necessary to send good models with wire size of teeth to be capped.

Send for price-list.

WANTED,

A capable young operator and crown and bridge expert to fill a position in Australasia, salary \$25 per week, with the probable increase to \$30 within twelve months, if found satisfactory. Address

"HEREFORD,"

Care COSMOS, Philadelphia.

FOR RENT,

Dental Office at Passaic, New Jersey. Occupied for many years by a prominent practitioner. Fine opening for a young dentist seeking a location. Favorable terms to right party. Address

J. W. LINDBLOM,

270 Passaic street, Passaic, New Jersey.

WANTED,

A dentist registered in New York, with \$1000 cash, to take partnership in old-established business. Address

"G. A.,"

Care DENTAL COSMOS.

Irregularities of the Teeth and Their Correction.

ORTHODONTIA, or the correction of irregularities (malocclusion) of the teeth, is the most recent departure as a "specialty" in medical science, and at present offers opportunities and rewards which are no longer possible in the other specialties.

THE ANGLE SCHOOL OF ORTHODONTIA

is the first and only one of its kind, and offers such opportunities for the thorough study of this branch as are nowhere else possible.

The Course of Instruction (both in Theory and Practice), is of a most thorough character, and includes comprehensive lectures on the associated branches of Rhinology, Comparative Anatomy of the Teeth and Jaws, and Art as Related to the Human Face, by the most competent professors obtainable. The class is limited to fifteen students, who must be ethical graduates in dentistry or medicine. Next term begins May 1st, and continues five weeks.

For further information address

EDWARD H. ANGLE,

1023 N. Grand Ave., ST. LOUIS, Mo.

Germiletum

OPPOSED TO GERM LIFE



FAC-SIMILE OF
3 AND 14-oz. BOTTLE,
REDUCED.

Germiletum THE PERFECT DENTAL ANTISEPTIC AND DISINFECTANT, WITHOUT ACID REACTION, SLIGHTLY ALKALINE. A Chemical Solution of Borohydrofluoric Acid, Borosallybenzoic Acid, Boroglycerine, Formaldehyde with Potassium Permanganate, Menthol, Thymol and Antiseptic Aromatics. Put up in the Most Elegant Prism-Shaped 3-oz. and 14-oz. Bottles. Indicated in all Dental Operative Work Wherever an Antiseptic or Disinfectant is Required. The Most Satisfactory Commendation is an Impartial Trial. Booklet giving full information mailed free on application. Large size (14-oz.) bottle free to dentists, they paying express charges.

DIOS CHEMICAL COMPANY, ST. LOUIS, MO.

The Columbia Electric Dental Engines.

FOR BOTH DIRECT AND ALTERNATING CURRENTS.



Type A. C. C. S. Alternating Current Engine. Suspended by Counterweight from a neat bracket.

We guarantee that our Alternating Current Engines operate in all respects just the same as those of the direct current type; they regulate in speed in either direction of rotation, start and stop quickly, and always respond promptly to every movement of the controller lever.

We know of no broader guarantee to offer; if we did, we would not hesitate to offer it.

There are many reasons why you should have an Electric Engine, and many more reasons why you should have

ONLY THE COLUMBIA.

The Columbia is "always ready and never in the way." They are noiseless. They are satisfactory. You will never feel obliged to apologize for them, as you might for some other. Our new catalogue is ready.

THE RITTER DENTAL MFG. CO.,
Rochester, N. Y., U. S. A.

Our Goods for Sale by
all Dental Dealers.

DENTAL DEPOT:
10 East 23d Street, New York City.

In writing for catalogue or information, please mention this paper.

The Best Antiseptic

For Both Internal and External Use.

LISTERINE

promptly destroys all odors emanating from diseased gums and teeth, and, by internal use, the foul gases from the stomach—an advantage the dentist will especially value for the relief of nervous dyspepsia during the treatment of the teeth. It is a PERFECT TOOTH AND MOUTH WASH, non-secret and professional, and therefore has received the highest recognition as the best general antiseptic for a dentist's prescription.

"LISTERINE is the strongest and safest of the antiseptics which are available for the prophylactic treatment of the oral cavity."—Miller.

For the patient wearing bridge-work or artificial dentures, and as a daily wash for the preservation of the teeth, Listerine is freely prescribed by many successful practitioners, who are aware that too often the skill of the dentist is questioned when the real cause for dissatisfaction is due to the patient's negligence in properly caring for the teeth and mouth.

"THE DENTIST'S PATIENT" and "LISTERINE IN DENTAL PRACTICE,"

two interesting pamphlets for the dental practitioner, may be had upon application to the manufacturers of Listerine.

LAMBERT PHARMACAL COMPANY, St. Louis, U. S. A.

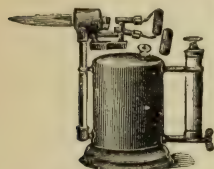


THE TURNER.....

Gasoline Porcelain



For Crown- and Bridge-Work. **Furnace No. 1.**



The Turner Gasoline
Blow-pipe No. 4 D.



The Turner Gasoline
Bunsen Burner.



The Turner Auxiliary
Bunsen Burner.



The Turner Gasoline Porcelain Furnace No. 1.

This Furnace is the neatest, cheapest, and best on the market. A perfect bake can be made in 2 to 5 minutes. This Furnace produces the most compact body, and the best color of any furnace known. The heating is done by means of the No. 4 D Gasoline Blow-pipe, which may be used separately to great advantage for soldering with pure gold or platinizing. We claim for this Furnace that it is impossible to gas your work, and that it will fuse the highest bodies successfully. Our Blow-pipes and Bunsen Burners are well adapted to laboratory work.

PRICES.

No. 1 Porcelain Furnace.....	each	\$15.00
" 4 D Blow-pipe	"	6.00
Bunsen Burner.....	"	4.00
Auxiliary Bunsen Burner.....	"	3.00

For sale by all Dental Supply Houses.



THE TURNER BRASS WORKS,
120 Kinzie Street,
CHICAGO.

Illustrated Catalogue sent on Application.





SUP-RE-NOL

OUR

Ideal Local Anesthetic

Has proven itself far superior to any LOCAL ANESTHETIC ever put on the market, and is bound to maintain its superiority because it is carefully compounded from the best materials and contains the ONE important ingredient—the only new discovery in this connection made in recent years—SUP-RE-NOL, which controls completely the action of cocain, making its effect last longer; deeper seated and without toxic effect. More than 5000 dentists are now using our anesthetic exclusively, and we expect every dentist to know the value and economy of this preparation. Cheaper in price than any other article on the market, and better in quality. Non-secret. No samples furnished, but for twenty-five cents in stamps we will send a trial ounce.

Price: 1 oz., 75c.; 5 ozs., \$3.00; 10 ozs., \$5.00

Manufactured by

IDEAL CHEMICAL CO.
St. Paul, Minn.

For sale by THE S. S. WHITE DENTAL MFG. CO.

Dr. R. B. Waite's Local Anæsthetic.

SAFE, RELIABLE, NON-SECRET.

FOR PROOF write us, stating what Anæsthetic you are now using, and receive a sample bottle *free of charge*.

Read Dr. Cryslér's Letter.

NIAGARA FALLS, ONT., February 22, 1901.

THE ANTIDOLAR MFG. CO., Springfield, N. Y.—*Dear Sir,*—I regret to say that being a sufferer from rheumatism which affects my hands mostly, I can only practice in a very irregular way, and have but recently finished the sample which you so kindly sent me some time ago.

I will, however, say that I believe it to be the best anæsthetic I have ever used, as the following test does, I think, fully demonstrate. Not having sufficient strength in my hands to extract a firmly imbedded tooth for one of my patients recently, I had to resort to the following method: After making an application of the Anæsthetic, I laid the tissue back freely from base of tooth, and used a bur to cut the septa of bone from between roots. I removed it without any difficulty with thumb and finger without causing a particle of pain to the patient. If I had had any doubts of its efficiency before, I certainly did not when I had completed that operation. I can only add to my further appreciation by inclosing you money order for \$2.00, for which kindly return me equivalent in your valuable Anæsthetic, and greatly oblige,

Yours very truly,

DR. A. C. CRYSLER.

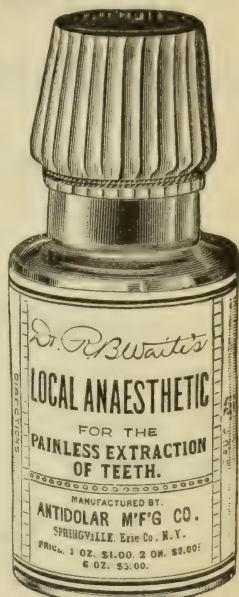
FOR SALE BY ALL DENTAL DEPOTS.

Price, 1 oz. \$1.00; 2 ozs. \$2.00; 6 ozs. \$5.00;
12 ozs. \$10.00; 20 ozs. \$15.00.

Or mailed upon receipt of price.

THE ANTIDOLAR MFG. CO.

FOR SALE BY THE S. S. WHITE DENTAL MFG. CO.



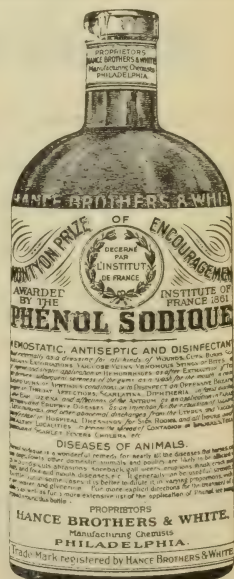
SPRINGVILLE,
ERIE CO., N. Y.

“Dental Uses of Phénol Sodique”

The title of a new pamphlet summing up the indications for Phénol Sodique in dentistry, as found in dentists' private reports, dental journals and text-books.

It gives the result of many years of experience of the best practitioners. Every dentist should have a copy. Sent upon request.

Write for Literature and a trial Sample.



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NEW YORK
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ESTABLISHED 1855

Pharmaceutical Chemists

PHILADELPHIA

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Missouri Dental College,

DENTAL DEPARTMENT OF WASHINGTON UNIVERSITY.

ST. LOUIS, MO.

The thirty-sixth annual session will begin in September, 1901, and continue seven months.

For annual announcement and any other information regarding the school, address

Dr. J. H. KENNERLY, Dean,

Care of Missouri Dental College,

ST. LOUIS, MO.

Michigan University Dental College.

ADMISSION EXAMINATIONS are held during the last week of June and September.

THE ANNUAL TERM begins September 25th and continues for nine months, closing the 20th of June.

THE AVERAGE ANNUAL FEES for tuition and laboratory expenses will be about \$65 for non-residents of Michigan.

THE ANNUAL ANNOUNCEMENT contains particulars and will be sent on request.

J. TAFT, Dean,

Ann Arbor, Mich.

University of Southern California—College of Dentistry.

LOS ANGELES, CALIFORNIA.

The Fifth Annual Course of this College will begin October 21, 1901. Commodious new rooms have been secured for the needs of our larger classes and the growing infirmary. Several new and able teachers have been added to the Faculty, in its reorganization.

Students who wish to avoid the rigors of a northern and eastern winter can do no better than to come to Southern California for their education.

Los Angeles is situated between the sea and mountains,—less than an hour's ride from either,—and January is the month of roses. We solicit correspondence from those and only those who can meet the highest requirements of the National Association of Dental Faculties.

For further information or catalogues, address the Secretary,

FRANCIS M. PARKER, B.L., D.D.S., 129½ W. First St.,

or the Dean,

GARRETT NEWKIRK, M.D., 203 S. Broadway, Los Angeles, Cal.

Georgetown University

School of Medicine.

DENTAL DEPARTMENT.

Formerly Washington Dental College, Washington, D. C.

Sessions will be held in daytime and begin October 1, 1901.

For terms and further information, apply to

W. N. COGAN, D.D.S., Dean,

1746 M Street, N. W., Washington, D. C.

UNIVERSITY OF MINNESOTA.

College of Dentistry.

A high-class school for high-grade students.

Entrance qualifications: Graduation from four-year High School course which includes two years Latin and one year physics.

Course: Three sessions of nine months.

Clinical facilities unsurpassed.

Last day for matriculation, session 1901-1902, September 11.

For further particulars, address

W. P. DICKINSON, D.D.S., Dean,

Andrus Building,

Minneapolis.

Detroit College of Medicine—

Department of Dental
Surgery.

DETROIT - - MICHIGAN.

Established 1891.

MEMBER OF NATIONAL ASSOCIATION OF DENTAL FACULTIES, and recognized by the NATIONAL BOARD OF DENTAL EXAMINERS.

The TENTH ANNUAL SESSION will begin September 26, 1900, and continue nine months.

THREE FULL COURSES OF STUDY of nine months each are required for graduation.

FEES—Matriculation, \$5.00; Regular Course, \$60.00; Graduation, \$30.00.

A perpetual ticket (not transferable), good for three or more courses, will be issued for \$150. For full particulars and annual announcement, address

Dr. H. O. WALKER, Secretary, No. 27 Adams Avenue, East,
or G. S. SHATTUCK, Professor in charge, Detroit College of
Medicine, Detroit, Michigan.

Harvard University, Dental Department.

BOSTON, MASS., 1901-1902.

FACULTY.

CHARLES W. ELIOT, LL.D., President.
EUGENE H. SMITH, D.M.D., Dean and Professor of Mechanical Dentistry and Orthodontia.
J. COLLINS WARREN, M.D., LL.D., Professor of Surgery.
HENRY P. BOWDITCH, M.D., LL.D., D.Sc., Professor of Physiology.
THOMAS DWIGHT, M.D., LL.D., Professor of Anatomy.
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HENRY C. SMITH, Ph.G., Assistant in Chemistry.
WALDO E. BOARDMAN, D.M.D., Curator of the Dental Museum and Librarian.

The Thirty-fourth Annual Session of this school begins September 25, 1902, and ends June 25, 1903, with a recess of one week at Christmas, and another in April, making a school-year of nine months of practically continuous work.

General Anatomy, Physiology, General Chemistry, Physiological Chemistry, Hygiene, Histology and Embryology, together with ample dissecting under able demonstrators, are the studies of the first year. The studies for the second year are Operative and Mechanical Dentistry and Orthodontia, Crown- and Bridge-Work and Metallurgy, Materia Medica and Therapeutics, Bacteriology, Dental Pathology and Oral Surgery. Of the third year the studies are Operative and Mechanical Dentistry and Orthodontia, Crown- and Bridge-Work, and Metallurgy, Neurology and Surgical Pathology and Surgery. Attention is called to the fact that TWENTY-SEVEN MONTHS of progressive instruction compose the required three years in the school.

All applicants for advanced standing must pass the examination of the years they desire to omit, or furnish proof that they have passed EQUIVALENT examinations.

The University Degree, D.M.D. (Dentariæ Medicinæ Doctor), is conferred upon all who fulfill the requirements.

Graduates of recognized dental schools will be admitted to the course of Operative and Mechanical Dentistry on payment of \$50 each, or \$100 for both, for the whole or any portion of the academic year.

FEES.

There are no fees for matriculation, nor for the diploma, nor for the demonstrators. For the first year the student is a member of the school the fee is \$200, payable in two instalments of \$120 and \$80; for the second year, \$150, in two payments of \$100 and \$50; for the third year, \$150, in two payments of \$100 and \$50. For any subsequent year \$50, payable at the beginning of the year. For information and announcement, address

EUGENE H. SMITH, Dean, 283 Dartmouth St., Boston, Mass.

ESTABLISHED 1845.

Ohio College of Dental Surgery.

DEPARTMENT OF DENTISTRY—UNIVERSITY OF CINCINNATI.

Session 1901-1902.

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GEORGE T. FETTE, B.A., D.D.S., Assistant Instructor in Histology.

The Fifty-fifth Annual Session begins October 8, 1901, and closes May 8, 1902.

A Spring Course of Clinical Instruction begins May 8, 1902.

A Fall Course of Clinical Instruction begins September 8, 1902.

For further information and announcement, address

H. A. SMITH, D.D.S., Dean,
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The Baltimore College of Dental Surgery, the first and for many years the only dental school, offers facilities for the study of dentistry proper, such as age and experience only can give. Its immense museum, complete apparatus, large and well-arranged building, and carefully studied curriculum give to its students great advantages and opportunities, both theoretical and practical, while its age gives its diploma a dignity far outranking all other colleges,—a diploma honorably represented in all civilized countries, and held by the most distinguished members of the dental profession.

The fact that dentistry must be practically taught is fully recognized, the College Infirmary, a most complete, large, and handsome hall, being daily filled with clean and respectable patients, of a class nearly equal to those of the average dentist. The Infirmary is open all the year, students paying an entrance fee, which is deducted from those of the regular succeeding course.

The session begins October 1, closing in April. A large corps of demonstrators, always present, put in actual practice the teachings of all lectures in dentistry,—leaving nothing undemonstrated. All methods are fully taught, all appliances and apparatus used; the making of instruments and the most elaborate gold and continuous-gum work, and all the cases arising in ordinary practice, with many which are rarely seen, carefully demonstrated.

Commencing October 1, 1895, women will be admitted to this College, subject to the same requirements as men.

The College has formed an alliance with the College of Physicians and Surgeons by which its students are privileged to attend all lectures and clinics. The patients of this medical school numbered last year over 40,000.

Graduates of the Baltimore College of Dental Surgery are required to attend but two sessions at the College of Physicians and Surgeons prior to presenting themselves as candidates for the degree of M.D. (See Catalogue.) The qualifications for entering the first year's course are in accordance with the resolutions adopted by the National Association of Dental Faculties.

TERMS OF GRADUATION.—Attendance on three winter courses of lectures in this College; as equivalent to one of these we accept one course in any reputable dental college. Graduates in Medicine can enter the Junior Class.

FEES.—Matriculation (paid only once), \$5.00. Tuition fee, \$100.00. Diploma fee, \$30.00. Dissecting fee, \$10.00.

Students corresponding with the Dean will please be careful to give full address, and direct their letters to

M. W. FOSTER, M.D., D.D.S., Dean, No. 9 W. Franklin St., Balt., Md.

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JOHN I. FRENCH, M.D.,
Instructor in Materia Medica and Therapeutics.

Entrance examinations will take place Tuesday, October 2, at 10 A.M.

Registration of students closes October 13, according to the requirements of the National Association of Dental Faculties, of which this school is a member.

For further information or catalogues address the Secretary,

CHARLES P. THAYER, A.M., M.D.,

74 Boylston Street, Boston, Mass.

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This College is a member of the National Association of Dental Faculties, and matriculation and graduation of students conform to the rules of this body.

The new building has all modern conveniences, including elevators, steam heat, electric light, gas for lighting and laboratory work, etc. The four floors have 14,000 square feet of space and 2000 square feet of windows without obstruction.

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Regular winter term begins October 1, 1901. Women admitted.

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SESSION 1901-1902.

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HENRY SEWALL, M.D., Professor of Physiology.
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E. F. DEAN, M.D., Professor of Anatomy.
E. C. HILL, M.D., Professor of Chemistry.
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Regular winter course begins October 7th, continuing seven months.

Last day of Matriculation October 17th.

This school is a member of the National Association of Dental Faculties, and the requirements for admission and graduation are those of all recognized schools.

Students matriculated for the collegiate year may avail themselves of the free infirmary course of daily practice from June 1st to October 7th.

Clinical facilities are ample. For information and announcements address

A. L. WHITNEY, D.D.S., Secretary,

604 McPhee Building, Denver, Colo.

College of Dentistry, University of Illinois

Harrison and Honore Streets, Chicago, Ill.



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This College is a member of the National Association of Dental Faculties, and matriculation and graduation of students conform to the rules of this body.

The building has all modern conveniences, including elevators, steam heat, electric light, gas for lighting and laboratory work, etc. The five floors have forty-eight thousand square feet of space.

The regular session of 1901-1902 will begin on Thursday, October 3, 1901, and continue for seven months.

For further information relating to the College of Dentistry, address **Dr. A. H. PECK, Dean, 92 State Street,** or **R. P. DONALDSON, Superintendent, 813 West Harrison St., Chicago, Ill.**

University of California.

COLLEGE OF DENTISTRY.

Parnassus Avenue, San Francisco.

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G. H. CASADAY, D.D.S., Laboratory Assistant in Chemistry and Metallurgy.

A. BAER, B.S., D.D.S., Assistant in Histology.

*Deceased.

The twentieth session will open Monday, September 2, 1901, and closes May 31, 1902. No student can be admitted after September 12.

The preliminary examination for admission will be held at the new College Building, Friday and Saturday, August 30 and 31, 1901.

REQUIREMENTS FOR ADMISSION.—Three years of high school work, including one year's study of Latin. High school diplomas or certificates covering this amount of work will be accepted in lieu of an examination.

Lists of studies and blank applications will be furnished on application.

C. L. GODDARD, Dean.

All communications should be sent to the Secretary,

HARRY P. CARLTON, Crocker Building, San Francisco, Cal.

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The fall session will begin September 3, 1900, the regular session October 1, 1900, and continue seven months, examinations and graduation exercises being held concurrently with those of the Medical Department.

The courses will be graded, and a feature of the plan of teaching will be the subdivision of the classes into small sections, each to receive in turn the same instruction.

For demonstrations in practical dentistry there will be a special room known as the Professor's Clinic-Room, fitted up with every modern appliance of value to the student. In this room there will be regular demonstrations to small classes, thus insuring the student the best opportunity of gaining a thorough knowledge of general practice.

Crown- and Bridge-Work will be thoroughly demonstrated, also Porcelain Work, in a room specially fitted up for the purpose.

By a rule adopted by the National Association of Dental Faculties, all students are required to enter their names not later than October 10.

FEES.

Matriculation (paid only once).....	\$5.00
Tickets for each course, including Laboratories.....	100.00
Dissecting fee.....	10.00
Diploma fee.....	25.00

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FORTY-SIXTH ANNUAL SESSION, 1901-1902.

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This College has accepted the requirements of the National Association of Dental Faculties with regard to admission and graduation of students. (See announcement for 1901-1902.)

Fall Session.

THE FALL COURSE will commence September 9, and continue until the 1st of October, and will be free to those who matriculate for the regular session.

The Regular Session

Will commence on October 1, 1901, and continue until May 1, 1902.

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Lecture hours excepted, general clinical practice is available for the student continuously through the day. Competent instructors are always present.

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A special feature of the curriculum of the New York College of Dentistry is that students work, daily, in the Infirmary, for the entire period of their college attendance—first, second, and third year—under the direction of the superintendents and demonstrators of the Infirmary.

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Applicants will be admitted to the Lecture Session of 1901-1902 as **DEGREE, SPECIAL, or SESSION STUDENTS.**

1. DEGREE STUDENTS.

Those matriculating toward the degree of D.D.S. under the following preliminary educational requirements:

a. For those who were matriculated in a registered dental or medical college prior to January 1, 1896, no preliminary educational conditions will be required, either for the degree of the college or the license examinations of the state of New York.

b. For those who were matriculated in a registered dental or medical college between January 1, 1896, and January 1, 1897, a certificate of two years of high school attendance or their equivalent in credentials from schools registered by the Regents or pass-cards for 24 academic counts obtained by Regents' examinations.

c. For those matriculated between January 1, 1897, and January 1, 1905, a certificate of three years of high school attendance or their equivalent in credentials from schools registered by the Regents or pass-cards for 36 academic counts obtained by Regents' examinations.

A graduate of a dental college out of the state of New York is not admitted to the dental license examination of the state of New York unless he has fulfilled the preliminary educational requirements of a "Degree Student."

2. SPECIAL STUDENTS.

Those who, without any preliminary educational requirements, matriculate, but not toward the degree, and attend the Infirmary practice, with lecture attendance **FREE**, pending their securing, by Regents' examinations, the preliminary educational requirements to become a "Degree Student," with their "Special Student" period credited as pupilage only. On the date of their obtaining 24 counts they become "Degree Students."

3. SESSION STUDENTS.

Those who hold credentials of preliminary education equivalent to "a certificate of entrance into the second year of a high school," matriculate for their first or first and second lecture sessions, but not toward the degree, pay the fees and are eligible to the examinations and certificates of the sessions. The certificates of the session or sessions will admit them to advance standing toward the degree in dental colleges **OUT OF THE STATE** belonging to the National Association of Dental Faculties.

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C. P. FRANKLIN, M.D., Assistant in Oral Surgical Clinic and Chief of Eye Clinic.

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The Principal Demonstrators are assisted by sixteen Assistant Demonstrators. Special Instructions are given in Continuous-Gum and Bridge- and Crown-Work.

Each year since its organization has added to the reputation and prosperity of this University Dental School, until now its graduates, in almost every part of the civilized world, are meeting with the success that ability will ever command. The past session was the most successful one in number of matriculates ever held; and visiting dentists from all parts of this country have expressed themselves as being astonished and gratified at the ability shown by the students when operating upon patients in the infirmary. Forming one of the departments of ONE OF THE OLDEST UNIVERSITIES in this country, its diploma is everywhere recognized and honored.

The instruction in both operative and mechanical dentistry is as thorough as it is possible to make it, and embraces everything pertaining to dental art. The advantages which the general and oral surgical clinics to which the dental students are admitted, as indeed to all the lectures of the University, afford, cannot be overestimated. The many thousands of patients annually treated in the University Hospital, well known to be the largest hospital in Baltimore, afford an abundance of material for dental infirmary and laboratory practice, and the oral surgery clinics.

The Infirmary and Laboratory practice for students is exceptionally large, a fact that adds so greatly to the facilities of this Dental School.

The Dental Infirmary and Laboratory Building is one of the largest and most complete structures of the kind in the world. The Infirmary is lighted by forty-seven large windows, and is furnished with the most improved operating chairs. It has again become necessary to enlarge the Dental Building, making an Infirmary nearly one hundred feet long, and a Laboratory eighty feet long and forty-three feet wide.

The Dental Infirmary and Laboratory are open daily (except Sunday) during the entire year for the reception of patients; and THE PRACTICE OF DENTAL STUDENTS has increased to such an extent that all the students during the past season have had an abundance of practical work in both operative and prosthetic dentistry. This means for practical instruction has already assumed such large proportions that the supply has been beyond the needs of the large classes in attendance during the past sessions. The exceedingly large number of patients for the extraction of teeth affords ample facilities for practical experience to every student.

In addition to the facilities afforded by this institution for a thorough course of instruction in the theory and practice of dentistry, the clinics in the University Hospital enable the Dental equally with the Medical Students to become familiar with the diseases and operations of Practical Surgery. Excisions of jaw, partial or entire; tumors cancerous or benign, of various parts of the buccal cavity; plastic operations for restoration of cheek, lips, etc., may be mentioned as having been before the class during the year. The induction of anesthesia by means of different agents—ether, chloroform, bromide of ethyl, nitrous oxid gas, all being used in the clinics—cannot fail to be of use to the student of Oral Surgery. Junior as well as Senior students are afforded every opportunity for practical instruction in both operative and mechanical dentistry.

The Lecture Halls in the University Buildings are large and well lighted; and every facility will be afforded for practical and theoretical dental instruction. Demonstrations

in Anatomy, Physiology, and Pathology (for which an abundance of material is furnished free of charge) also form an important part of the regular course. The Dissecting Room is large, well ventilated and lighted, and the Demonstrator of Practical Anatomy passes much of his time assisting the students and directing their labors. Dissecting Material is furnished in abundance, free of charge.

The Qualifications for Admission and Graduation are those adopted by the National Association of Dental Faculties and the State Dental Examining Boards. The Diplomas of this School are recognized by all State Dental Examining Boards.

Qualifications for Graduation: The candidate must have attended three full courses of lectures of seven months each in different years at the Regular or Winter Sessions in this institution. As equivalent to one of these, one course in any reputable dental college will be accepted. Graduates of medicine can enter the Junior Class; also those who have attended one full medical course. The matriculant must have a good English education; a diploma from a reputable literary institution, or other evidence of literary qualifications will be received instead of a preliminary examination. All students, both juniors and seniors, have equal advantage in operative and mechanical dentistry in this institution throughout every session.

Graduation in Medicine: Graduates of the Dental Department of the University of Maryland are required to meet the requirements as specified in the annual catalogue, prior to presenting themselves as candidates for the degree of "Doctor of Medicine."

The Regular or Winter Session will begin on the 1st day of October, and will terminate in April of each year.

The Summer Session, for practical instruction, will commence in May, and continue until the Regular Session begins. Students in attendance on the Summer Session will have the advantage of all the daily Surgical and Medical Clinics of the University.

The fees for the Regular Session are \$100, Demonstrators' fees included; Matriculation Fee, \$5; Diploma Fee, for candidates for graduation, \$30; Dissecting Tickets, \$10.

For Summer Session, no charge to those who attend the following Winter Session.

Board can be obtained at from \$3.50 to \$5.00 per week, according to quality.

The University Prize and a number of other Prizes will be specified in the annual Catalogue.

Students desiring information and the annual Catalogue will be careful to give full address and direct their letters to

F. J. S. GORGAS, M.D., D.D.S.,

Dean of the Dental Department of the University of Maryland,

845 N. Eutaw Street, Baltimore, Md.

Columbian University,

DENTAL DEPARTMENT.

1325 H Street, Northwest, Washington, D. C.

B. L. WHITMAN, D.D., President of the Columbian University.

J. HALL LEWIS, D.D.S., Professor of Dental Prosthetics.

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E. A. De SCHWEINITZ, Ph.D., Professor of Chemistry.

WM. P. CARR, M.D., Professor of Physiology.

STERLING RUFFIN, M.D., Professor of Materia Medica.

D. K. SHUTE, A.B., M.D., Professor of Anatomy.

J. R. HAGAN, D.D.S., Professor of Oral Surgery.

The Regular or Winter Session begins about the first of October and ends April 30.

The Infirmary opens October 1 and closes July 1.

FEES.

Annual Tuition Fee.....\$100

There are no other Charges or Extras of any kind whatever.

For further information, address

J. HALL LEWIS, D.D.S., Dean,

1023 Vermont Avenue, N. W., Washington, D. C

University of Pennsylvania,

DEPARTMENT OF DENTISTRY.

FACULTY.

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ALEXANDER C. ABBOTT, M.D., Professor of Bacteriology.

GEORGE G. MILLIKEN, M.D., D.D.S., Assistant Professor of Operative Technics.

JOHN D. THOMAS, D.D.S., Lecturer on Nitrous Oxid.
MEYER L. RHEIN, M.D., D.D.S., Lecturer on Dental Pathology.
SAFFORD G. PERRY, D.D.S., Lecturer on Operative Dentistry.
FREDERICK A. PEESO, D.D.S., Lecturer on Crown- and Bridge-Work.

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Dr. W. R. MILLARD,	Dr. EDW. I. KEFFER,	Dr. I. F. WARDWELL,
Dr. D. N. McQUILLEN,		Dr. JOHN R. YORKS.

DEMONSTRATORS.

Operative Dentistry.

WILLIAM DIEHL, D.D.S., Chief Demonstrator.
Assistants.

WILSON ZERFING, D.D.S.	L. W. DARLINGTON, D.D.S.
R. HAMILL D. SWING, D.D.S.	JOHN A. McCLAIN, D.D.S.
WM. C. MARSH, D.D.S.	S. MERRILL WEEKS, D.D.S.
FREDERICK W. ALLEN, D.D.S.	T. VICTOR SMITH, D.D.S.

Mechanical Dentistry.

A. DEWITT GRITMAN, D.D.S., Chief.	
JAMES G. LANE, D.D.S.	MILTON N. KEIM, JR., D.D.S.
FREDERICK W. AMEND, JR., D.D.S.	ROBERT J. SEYMOUR, D.D.S.
A. SWANTON BURKE, D.D.S.	EUGENE LINCOLN, D.D.S.
JAMES A. DOWDEN, D.D.S.	

Crown- and Bridge-Work.

J. E. DUNWOODY, D.D.S., Chief.
AMBLER TEES, Demonstrator Dental Ceramics.
AUGUSTUS KOENIG, M.D., Demonstrator of Metallurgy.
GEORGE J. PAYNTER, D.D.S., Assistant Demonstrator of Operative Technics.

Normal Histology.

ROBERT FORMAD, M.D. GEO. H. CHAMBERS, M.D.
AUGUSTUS KOENIG, M.D.

Chemistry.

DANIEL W. FETTEROLF, M.D.

Anatomy.

EDMUND W. HOLMES, M.D.

Osteology.

J. M. SWAN, M.D.

CONDITIONS OF ADMISSION.

Candidates for admission are required to present evidence of a preliminary education as follows:

For the session of 1900-01, a diploma of an approved high school having a three years' course or certificate showing three years' attendance at a high school having a four years' course, certificates from other schools showing equivalent education. In lieu of such diploma or certificates, the applicant will be required to pass a matriculate examination which will in each case be the equivalent of that forming the basis of the certificates of required preliminary education.

N. B.—Special attention is called to the rule adopted by the National Association of Dental Faculties, August, 1895, requiring all applicants for matriculation to be present and enter their names not later than the 10th of October. This rule applies equally to students entering the second and third year classes.

FEES.

Matriculation Fee (paid once only).....\$5.00	Dissecting Fee (Second Year).....\$10.00
Fee for One Course of Lectures.....100.00	Graduation Fee (Third Year)..... 30.00

Board can be obtained at from five to eight dollars per week, according to location and accommodations.

University of Pennsylvania.—Dental Department.

The Dental Department is located in "Dental Hall," the new building especially erected for its use. The facilities thus afforded are, it is believed, unequaled for securing an education complete in all departments of dental science and art. The clinical operating room is 180 by 50 feet, lighted on all sides, and furnished with 100 Wilkerson Chairs of latest pattern, especially constructed for the Department. Each operating chair has a fountain spittoon attached, also especially designed and constructed for this Department. Electrical service is supplied to all the chairs, and is of a character to cover all of the applications of electricity to dentistry. The Prosthetic Department is supplied with laboratory facilities devoted to every branch of the work. Prosthetic technic, in vulcanite and metal work, porcelain work, continuous-gum work, and crown- and bridge-work, is taught by modern methods in separate laboratories especially equipped for the purpose. The laboratories are furnished with power lathes and with compressed-air apparatus for soldering and metallurgical operations.

The clinical patronage of the Department is always in excess of the needs of the students.

Oral surgical clinics, also general surgical clinics, are held twice a week.

Practical instruction in Chemistry, Metallurgy, Histology, Physiology, and Bacteriology is given in appropriately equipped laboratories.

The Dissecting-Room is large, well lighted, thoroughly ventilated, and is furnished with ample material for the successful prosecution of anatomical studies.

The technic or manual training method of imparting instruction is developed in relation to all departments where it has been found applicable.

All of the departments of practical laboratory and clinical instruction are in charge of competent and experienced demonstrators, who are ably assisted in the work of instruction by a full corps of expert assistants.

The Dental Department of the University is an integral part of the University system. Its students at the discretion of the Dean are permitted to take courses of instruction in other departments of the University without additional fees, and are eligible to and participate in all those features of University life common to the whole student body of the institution. These include its athletic features and privileges of the Howard Houston Hall, the club house of an organization governed by the University students and having all of the appointments and desirable features of a strictly first-class club. The dormitories of the University are the best of their kind in this country, and to these the students of dentistry are admitted in common with the students of all the other departments.

The Regular or Winter Session.

The session begins October 1, and ends at Commencement, early in June. The number of lectures per week, with a synopsis of the various branches taught, will be found in the General Catalogue.

In order to facilitate work in the practical departments, the regular winter session is so arranged that the first-course student is required to divide the morning hours equally between DENTAL TECHNIC, HISTOLOGICAL, AND CHEMICAL LABORATORY WORK.

During the second and third years the student has the entire forenoon of each day for practical dental work. Ample opportunity is thus afforded for practice in operative and prosthetic dentistry. The first-year classes are divided into sections, the time not otherwise engaged being devoted to practice in the operative and mechanical rooms.

This plan of GRADING THE COURSE, and of affording the first and second year students an opportunity of coming forward for examination in certain branches, not only proves an economical arrangement of their time, but greatly facilitates their labors in the acquirement of knowledge in the remaining branches.

Plan of Examination.

Attendance upon three regular courses of lectures will be required before the student can take the final examination for the degree of Doctor of Dental Surgery.

At the close of the first year, final examinations are held in CHEMISTRY AND MATERIA MEDICA, ELEMENTARY ANATOMY, HISTOLOGY, OSTEOLOGY, and MYOLOGY, and in PHYSIOLOGY excepting the Muscular and Nervous Systems. At the end of the second year the student is examined finally upon ANATOMY and PHYSIOLOGY; and in progress in OPERATIVE and MECHANICAL DENTISTRY; if he is not qualified, a second examination is afforded him at the beginning of the next winter session.

The final examination at the close of the third year is in OPERATIVE DENTISTRY, MECHANICAL DENTISTRY, METALLURGY, BACTERIOLOGY, CLINICAL DENTISTRY, DENTAL PATHOLOGY AND THERAPEUTICS, AND ORAL SURGERY.

All applicants for advanced standing must pass the required examinations of this school, or furnish proof that they have passed EQUIVALENT examinations in some recognized dental or medical school. Graduates of a recognized medical college will be admitted to the second-year class without examination.

For detailed information and announcements, address

EDWARD C. KIRK, D.D.S.,

Dean of the Dental Faculty,

Dental Hall, Cor. 33d and Locust Sts., Philadelphia, Pa.

NEW ORLEANS COLLEGE of DENTISTRY

COR. CARONDELET AND LAFAYETTE STS.

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C. VICTOR VIGNES, D.D.S., Secretary.

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CHAS. ECKHARDT, D.D.S., Professor of Dental Materia Medica and Anesthetics.
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WM. ERNEST WALKER, D.D.S., M.D., Professor of Orthodontia and Facial Orthopedia, Microscopy, Bacteriology and Clinical Dentistry.

CLINICAL STAFF.

- WM. ERNEST WALKER, D.D.S., M.D., Professor of Clinical Dentistry and Superintendent of the Clinic.
JULES J. SARRAZIN, D.D.S., Clinician of Operative Dentistry.
L. D. ARCHINARD, D.D.S., Clinician of Dental Surgery.
H. B. GESSNER, A.M., M.D., Clinician of Oral Surgery.
S. R. OLLIPHANT, M.D., Clinician of General Anesthetics.
CHAS. ECKHARDT, D.D.S., Clinician of Local Anesthetics.
C. V. VIGNES, D.D.S., Clinician of Prosthetic Dentistry.
OTTO LERCH, A.M., M.D., Ph.D., Clinical Diagnostician.
WM. ERNEST WALKER, D.D.S., M.D., Clin. Orthodontia and Facial Orthopedia.
R. H. WELSH, D.D.S., Assistant Clinician of Orthodontia.
P. A. MICHEL, D.D.S., Assistant Clinician of Operative Dentistry.
J. PAUL BAYON, D.D.S., Assistant Clinician of Operative Dentistry.
J. H. LANDRY, D.D.S., Assistant Clinician of Prosthetic Dentistry.
EDWARD GAMARD, D.D.S., Assistant Clinician of Prosthetic Dentistry.
S. S. GROSJEAN, D.D.S., Assistant Clinician of Prosthetic Dentistry.
(TO BE APPOINTED), Assistant Clinical Diagnostician.
JULES LAZARD, M.D., Assistant Clinician of Oral Surgery.

DEMONSTRATORS.

- J. H. LANDRY, D.D.S., Demonstrator of Operative Dentistry.
J. PAUL BAYON, D.D.S., Demonstrator of Operative Dentistry.
EDWARD GAMARD, D.D.S., Demonstrator of Prosthetic Dentistry.
R. H. WELSH, D.D.S., Demonstrator of Orthodontic Technics.
P. A. MICHEL, D.D.S., Demonstrator of Operative Technics.
H. P. MAGRUDER, D.D.S., Demonstrator of Prosthetic Technics and Metallurgy.
P. L. CUSACHS, A.B., M.D., M.Ph., Demonstrator of Chemistry.
JULES LAZARD, M.D., Demonstrator of Anatomy.
O. L. POTHIER, M.D., Demonstrator of Microscopy and Bacteriology.

Also Seven Assistant Demonstrators and Fourteen Special Lecturers.

NEW ORLEANS, the metropolis of the South, offers unlimited clinical material, complete educational facilities, a delightful winter climate, convenient bicycle routes, inexpensive recreations, its world-famous Mardi Gras celebrations, and board as low as \$3.00 per week. Dentistry is taught practically and didactically. Collateral medical branches are fully illustrated in clinics and laboratories.

CALENDAR.

Entrance examinations conducted by the office of the Superintendent of Public Instruction, for students arriving without the required preliminary education certificate, begin.....	SEPTEMBER 16.
Close	OCTOBER 10.
Examinations for advancement begin.....	SEPTEMBER 16.
Opening of regular session, 8.30 A.M.....	OCTOBER 1.
Matriculation for full regular session closes.....	OCTOBER 10.
Practitioners' Course begins.....	FEBRUARY 15.
Practitioners' Course ends.....	MARCH 31.
Final Examinations begin:	
Senior Class.....	APRIL 14.
Junior and Freshman Classes.....	APRIL 28.
Contests for graduation medals in Operative and Prosthetic Dentistry begin	APRIL 28.
End	MAY 2.
Commencement Exercises	MAY 5.
Practical Clinical Dentistry Course begins.....	JUNE 9.
Ends	SEPTEMBER 30.

The College holds membership in the National Association of Dental Faculties, and its diploma is recognized by the National Association of Dental Examiners.

For further information and Announcement, address

C. V. VIGNES, D.D.S., Sec'y, 637 Canal St., New Orleans, La.

